VARIETIES OF APPLES IN OHIO

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BULLETIN 290

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BULLETIN
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VARIETIES OF APPLES IN OHIO

W. J. GREEN, PAUL THAYER, J. B. KEIL

The main purpose of this bulletin is to present the most important facts regarding variety characteristics of the apple. Knowing what one wants in a variety; whether for near or distant market; for dessert or special culinary purposes he will, it is believed, be able to find in the discussions herein given, those varieties which are best suited to his needs. The technical descriptions have been reduced to the shortest space possible and stripped of unusual terms, but sufficient have been retained to make these descriptions usable and helpful in identification of varieties.

To make the best possible use of these descriptions and characterizations, one should, first of all, determine what character in a variety will best suit his purpose. He should then study varieties in his neighborhood and learn which are best suited to that soil and locality; he will then be able to compare and check them with the observations made in this bulletin as to variety habits and peculiarities. This method will yield better results than to neglect the opinions of practical orchardists or to give heed to their advice altogether.

The variety problem is only partly solved when one learns which ones are suited to his soil. It is equally important that the orchardist should know the characteristic habits of each. "If I were to select my varieties again, I should make several changes," is an admission often made by experienced apple growers. Doubtless mistakes can never be wholly avoided, but the farther one gets from the notion that soil and climate take precedence over all other

factors the less serious the errors will be. It is of but little avail to know that a variety is suited to a particular soil unless the further knowledge is possessed that it has the desired characteristics. The soil side of the problem is touched upon but little in this bulletin, because soils are so varied and so many factors enter in to complicate matters. It is true that not all variety characteristics are constant, but they must be considered with reference to environment.

The conclusions herein stated should be put to the test by orchardists, and if any of the statements are unwarranted the authors will welcome corrections. J. B. Keil has done most of the work and prepared the manuscript, but if misstatements have been made the other authors must share the blame.

In future editions it is expected to include many new varieties and to give more attention to yields, and also to add to the observations regarding habits of varieties.

A number of publications relating either wholly or in part to varieties of apples have been used since the beginning of the preparation of material for this bulletin. The references are given in the text of the descriptions or in footnotes at the bottom of the pages. The most prominent among these are the "Apples of New York," Vols. I and II, S. A. Beach; "The American Horticultural Manual," Part II, Budd & Hansen; "American Pomology, Apples," John A. Warder; "The American Fruit Culturist," John J. Thomas; "Promising New Fruits," articles in the U. S. Department of Agriculture Yearbooks; "Fruits of Ontario," published by the Ontario Department of Agriculture; "Fruits and Fruit Trees of America," Charles Downing.

The descriptions of the trees and fruit of the varieties as given in the following pages, were rewritten from more technical descriptions prepared during the last 5 years.

During this time also, the records of blooming periods, yields of fruit and dates of picking were secured, with results of storage tests.

THE NAMES AND IDENTIFICATION OF VARIETIES

References for nomenclature: "Nomeclature of the Apple," by W. H. Ragan, issued in 1905 by the Bureau of Plant Industry of the U. S. Department of Agriculture as Bulletin No. 56, together with the more recent list published as additions or corrections to that work, has been made the subject of constant reference in preparing the descriptions appearing in this bulletin. The code of

nomenclature of the American Pomological Society, adopted by that body at Boston, September 10, 1903, was followed in these lists, and has been the standard for naming the new varieties which have appeared since its adoption.

Throughout the descriptions the approved name has been given first place, with only an occasional mention of a synonym. In considering such old and well-known varieties as Ralls, Fameuse, Fallawater, Rhode Island and Belmont, some of which have a long list of synonyms, the need for a simplified nomenclature becomes apparent.

Fruit growers, or others who discover or originate new varieties of apples, should, if possible, consult these lists before deciding upon names for new fruits.

Department identification: During the course of the apple season the Department of Horticulture is called upon to identify a large number of samples of varieties of apples. With the many well-known varieties growing and fruiting in the Station orchard for comparison, this is not difficult, but with the varieties which are not extensively grown the task is often troublesome. Occasionally specimens are sent which grew on seedling trees, and consequently cannot be identified by reason of having no name.

While the descriptions given in this bulletin may be of some use to the fruit grower in identifying varieties, a more detailed and technical description is often necessary in order to distinguish between closely related varieties, or those which may resemble each other in fruit only, while the trees may differ widely.

In case it is desired to send samples of apples to this Department for identification, a certain amount of information concerning the tree or trees will greatly facilitate the work. Upon request blanks will be sent which, when filled out, will give the information needed.

Except in the case of the very common and well-known varieties such as Baldwin, Ben Davis, Grimes, Jonathan, and so forth, an identification can be made much more readily from a half-dozen specimens than from one, and, wherever possible, at least four apples should be sent, which may be wrapped in paper and packed in a suitable box in such a manner that the fruit will be carried safely by parcel post.

All specimens for identification and correspondence concerning them should be addressed to the Department of Horticulture, Ohio Experiment Station, Wooster, Ohio.

THE STORAGE TESTS

The remarks on the behavior of varieties of apples in storage, as given in the descriptions, are based on storage tests of four seasons in cellar storage, one test in cold storage, in addition to a test of various wrappers on 30 common varieties in cold storage.

A storage room in the building occupied by the Department of Nutrition was used for the cold storage tests.

Cold storage lengthens the season of apples from 1 to 4 months beyond that of cellar storage.

THE PERIOD OF BLOOM

Records have been made from all the varieties in the Station orchard on the period of bloom, taking the time when the first fully opened blossoms appear as the beginning of the period, and when all the blossoms have opened as the period of full bloom. Where dates are given in the descriptions they are averages from 4 years' records, except in a few cases in which the trees or grafts produced no bloom in one or more of the years.

Variety differences: The majority of the varieties bloom in practically the same period, while very few are at the extremes of the season, so that if planted in adjacent rows there would be no opportunity for natural cross-pollination between the earliest and latest in period of bloom.

In considering the period of bloom of a particular variety, allowance must be made for the difference due to latitude. For example, Rome Beauty is in full bloom about May 10 in Wayne County, when the same variety in Washington County (approximately a hundred miles farther south) is sufficiently advanced for the application of the first spraying after bloom, or a difference of 8 or 10 days.

The common varieties blooming early in the season are Longfield, Tompkins King, Mann and Oldenburg. Those which are definitely late blooming are Northern Spy, Rome Beauty, Ensee, Mother, Ralls and Ingram. Livland and Williams are the latest blooming among summer varieties.

Cross-pollination: In the Station orchard with more than 400 varieties promiscuously interplanted and grafted, cross-pollination is promoted to the fullest extent. The periods of bloom overlap sufficiently to provide pollen for every variety blooming in the orchard. The table of disease susceptibility by Professor A. D. Selby, which appears in this publication, includes a column giving the relative period of bloom from records of five normal seasons, for the varieties therein listed.

DISEASE SUSCEPTIBILITY

(A. D. SELBY AND OTHERS)

That there are great differences among the varieties of apples grown in the State with respect to the diseases from which they suffer is well known to both nurserymen and orchardists. The endeavor in this paper has been to present these differences as accurately as known, in tabular form; hence, a comparative summary is given for the varieties included. The relative time of blossoming is also included for Wooster, being supplied by J. B. Keil.

In form of statement the relative susceptibility of each variety to the diseases, collar rot, blister canker, scab, bitter rot, blotch, black rot of fruit and canker of branch, rust, physiological fruit spot, fungus fruit spot and water-core are given, together with a column upon special characteristics or weaknesses, when such are known. By susceptibility is meant the tendency to be attacked by the disease and to suffer from it; susceptibility is used as the opposite of resistance. When a variety is susceptible to a given disease it is non-resistant; when not susceptible the variety is properly said to be resistant to the trouble; and, if not known to be attacked by the disease which is present on other sorts in question, it may properly be recorded as "immune".

Under the columns devoted to certain diseases it will be seen that the record is very incomplete. Under the more serious diseases mentioned upon which our information is limited, question marks have been freely used. This is especially the case in the columns devoted to records upon collar rot and blister canker. These marks are used to indicate both the absence of information and the urgent need of it before we can know the probabilities of these varieties in the southern districts where collar rot and blister canker have heretofore caused the most injury.

Utility of a table of disease susceptibility: The commercial importance of accurate information as to disease susceptibility is very great, and the ultimate aim of this paper is to collect such complete and accurate data with regard to Ohio apple varieties. Apple orchards normally live for many years, so that the investment in an orchard is semi-permanent, and the premature loss of a part of it operates as a loss of capital to the owner. Thus premature loss or dying of portions of bearing orchards operates to diminish both the profits of the individual owner and the commercial possibilities of the community. The dying of Grimes Golden trees in southern Ohio from collar rot, and of Ben Davis from blister canker, may be

cited to illustrate the action of these two diseases. Similarly in northern Ohio the recent losses of Baldwin trees from winter injury have been closely parallel in results to the disease attacks of the southern districts. The differences in final results will largely depend upon the cumulative or continuous effects of unchecked disease attack as compared with the occasional recurrence of winter injury. If both classes of risks of capital impairment in the orchard are avoidable under otherwise equally favorable outlook for profit, then foresight demands such action.

It is a fatal weakness in such an investment as is represented by an apple orchard to be burdened with varieties possessing such marked disease susceptibility as is shown by Grimes Golden and Ben Davis with respect to collar rot and blister canker. An equal drawback is shown by Bentley Sweet in its susceptibility to bitter rot. Recent years have shown the grave problem of susceptibility to blight in apple varieties. It seems probable that we must secure blight-resistant and blight-immune types. In the case of Grimes Golden we may overcome the collar rot very largely by top-grafting the trees, but no such means of avoiding the varietal weaknesses or special susceptibilities are known in the great mass of parasitic diseases covered by the table. Commercial apple growing demands efficient performance by each orchard unit such as the apple tree. Any continued failure in performance which may also become a source of outlay, as in disease control, involves risks that the orchardist should seek to avoid in his selection of varieties to plant. The table here offered supplies the approximate basis upon which varietal selections may be founded, though at the same time warnings against other weaknesses are included.

Disease description elsewhere: The diseases to which references are made cannot be described within the limits of a brief paper. These descriptions are published in Bulletin 214, "A Brief Handbook of the Diseases of Cultivated Plants in Ohio," March, 1910, which may be obtained upon application. The blister canker is discussed in a separate paper, Circular 125, while the directions for spray treatment to control diseases of the apple are found in the "Spray Calendar," Bulletin 232, and Circular 149.

Acknowledgments: While the differences in the susceptibility to disease, shown by the varieties of apples commonly grown, have been stated in station bulletins and in plant disease reports to the Ohio State Horticultural Society, the tabulations of these differences had not been indicated.

Professor W. J. Green, Station horticulturist, suggested late in 1912 that such a table would be very useful if it could be prepared. Accordingly the writer began the preparation of the table and wishes to express his obligations to Professor Green for much data included. J. B. Keil and Paul Thayer, of the Department of Horticulture, and R. C. Walton and Wayne Van Pelt of the Department of Botany, together with such growers as E. G. and U. T. Cox, of Proctorville, Frame C. Brown, of Westerville, L. B. Yaple and F. H. Seeling, of Chillicothe, and many others have contributed information which is always appreciated. Professors W. Paddock and V. H. Davis, of the Ohio State University, have assisted in a similar manner, and verbal notes have been contributed by a number of apple growers.

It is by the free offering of additional notes and corrections to the matter as herein published that we shall be able more nearly to complete such a table of apple disease susceptibility and to make it of greater service. We are under obligations for many notes freely contributed since the publication of Circular 133, April 15, 1913.

TABLE I. Disease susceptibility of apple varieties in Ohio

	Variety	Relative time of blooming	Diseases	
			Collar rot	Blister canker
1	Arkansas	M*	Slightly	?
2	Arkansas Black	M	.....	?
3	Astrachan	E	?	Very suscep.
4	Babbitt	M*	.....	?
5	Baldwin	M	Moderately	Rather suscep.
6	Baltimore	E	.....	.....
7	Banana	M	.....	.....
8	Belmont	M*	Moderately	.....
9	Ben Davis	M†	Moderately	Very suscep.
10	Bentley (sweet)	E	.....	Probably suscep.
11	Bietigheimer	No data	?	.....
12	Boiken	M*	.....	.....
13	Bough (sweet)	M*	.....	.....
14	Delicious	M†	.....	.....
15	Duling	E	.....	.....
16	Early Harvest	E	.....	Probably suscep
17	Early Strawberry	No data	.....	.....
18	Ensee	M†	.....	.....
19	Esopus Spitzenberg	No data	.....	.....
20	Fallawater	M*	Very suscep.	Quite suscep.
21	Gano	M	.....	Probably suscep
22	Golden Sweet	No data	.....	.....
23	Gravenstein	E	.....	.....
24	Greenville	M	?	.....
25	Grimes Golden	M*	Very suscep.—South	Quite suscep.
26	Hubbardston	M	.....	Quite suscep.
27	Ingram	L	.....	.....
28	Jefferis	M†	Slightly	.....
29	Jonathan	M	Moderately	Slightly
30	King David	M	?	.....
31	Lankford	M†	.....	.....
32	Late Strawberry	M*	.....	.....
33	Livland Raspberry	M*	.....	.....
34	Lowell	M*	?	.....
35	Maiden Blush	M	Very suscep.	.....
36	Mann	E	Quite suscep.	.....
37	McIntosh	M*	.....	.....
38	Minkler	No data	Not suscep.	Not suscep.
39	Missouri Pippin	M	?	Probably suscep
40	Newtown Pippin	M*	Slightly	.....
41	Northern Spy	L	Rather suscep.—South	Somewhat
42	N. W. Greening	L	?	Rather suscep.
43	Ohio Nonpareil	E	?	.....
44	Oldenburg	E	Slightly	.....
45	Oliver Red (Senator)	M	.....	.....
46	Ralls Janet	L	?	Not suscep.
47	Rambo	M	Slightly	Rather suscep.
48	Red Canada	L	.....	.....
49	Red June	M*	?	.....
50	R. I. Greening	M*	?	Rather suscep.
51	Rome Beauty	L	Slightly	Quite suscep.
52	Roxbury Russet	M	.....	.....
53	Salome	M	?	.....
54	Smith Cider	M	Very suscep.	Not seriously
55	Stark	M	Very slightly	.....
56	Stayman Winesap	M	.....	.....
57	Summer Rambo	M	.....	.....
58	Sutton	M*	Very suscep.	.....
59	Tompkins King	E	Very suscep.	.....
60	Wagener	M*	?	?
61	Wealthy	M	Very slightly	.....
62	White Pippin	M	Very slightly	.....
63	Williams	L	.....	.....
64	Winesap	M†	.....	Not suscep.
65	Winter Paradise (sweet)	M*	.....	Not suscep.
66	Wolf River	M†	.....	.....
67	Yellow Bellflower	M*	Not suscep.	Not suscep.
68	Yellow Transparent	M*	Quite suscep.	?
69	York Imperial	M*	Moderately	?

E-Early blooming.
M-Medium or mid-season blooming.
L-Late blooming
M*-Medium to early blooming.
M†-Medium to late blooming.

TABLE I.—Continued

Diseases				
Twig blight	Scab	Bitter rot	Blotch	
Slightly	Rather seriously	Moderately	?	1
Slightly	Seriously	.....	.....	2
Slightly	Very suscep.	.....	Not suscep.	3
Very slightly	Somewhat	.....	.....	4
Slightly	Very slightly	Very slightly	Very slightly	5
Very suscep.	Very slightly	Very slightly	.....	6
Quite suscep.	Moderately	.....	.....	7
Somewhat	Very suscep.	.....	.....	8
Not seriously	Very slightly	Rather suscep.	Rather suscep.	9
Rather suscep.	Slightly	Very suscep.	.....	10
Not seriously	Not suscep.	.....	.....	11
Somewhat	Not suscep.	.....	.....	12
Quite suscep.	Not suscep.	.....	.....	13
Nearly immune	Very suscep.	.....	.....	14
Very suscep.	Quite suscep.	.....	.....	15
Very suscep.	Very suscep.	Somewhat	.....	16
?	Rather suscep.?	.....	.....	17
Rather suscep.	Rather suscep.	.....	.....	18
Rather suscep.	?	.....	.....	19
Sometimes seriously	Not suscep.	.....	.....	20
Not seriously	Very slightly	Rather suscep.	Rather suscep.	21
Rather suscep.	Very slightly	... .	.....	22
Moderately	Quite suscep.	.....	.....	23
Rather suscep.	Not seriously	.....	.....	24
Very seriously—South	Not seriously ?	Rather suscep.	Quite suscep.	25
Not seriously	Somewhat	.....	.....	26
Occasionally blossoms	Slightly	.....	.....	27
Occasionally blossoms	Rather suscep.	Occasionally	.....	28
Very seriously	Slightly	Moderately	.....	29
At times seriously	Somewhat	.....	.....	30
Almost immune	Not suscep.	.....	.....	31
Almost immune	Not suscep.	.....	.....	32
Rather suscep.	?	.....	.....	33
Quite suscep.	Slightly ?	... .	?	34
Quite suscep.	Very suscep.	Quite suscep.	Frequently	35
Rather suscep.	Slightly	.....	Very suscep.	36
At times suscep.	Very suscep.	.....	.....	37
Not suscep.	Not suscep.	.....	Not suscep.	38
Not suscep.	Very suscep.	. .....	.....	39
Rather suscep.	Very suscep.	Sometimes	.....	40
Quite suscep.	Very suscep.	At times suscep.	.....	41
Slightly	Very suscep.	.....	Very suscep.	42
Very suscep.	Slightly	.....	Not suscep.	43
Sometimes	Somewhat	.....	At times	44
Moderately	Slightly	.....	.....	45
Occasionally blossoms	Very suscep.	Quite suscep.	.....	46
Slightly	Very suscep.	Very suscep.	Occasionally	47
Very slightly	Quite suscep.	Rather suscep.	.....	48
Rather suscep.	Quite suscep.	.....	.....	49
Very suscep.	Slightly	Moderately	Slightly	50
At times suscep.	Very suscep.	Slightly	Slightly	51
Slightly	Not suscep.	.....	Not suscep.	52
Moderately	Slightly	Very suscep.	?	53
Rather suscep.	Very suscep.	Moderately	Very suscep.	54
Very suscep.	Rather suscep.	.....	Rather suscep.	55
Not seriously	Quite suscep.	.....	.....	56
Occasionally	Quite suscep.	.....	Quite suscep.	57
Very suscep.	Slightly	.....	.....	58
Very suscep.	Somewhat	.....	.....	59
Very seriously	Somewhat	.....	.....	60
Quite suscep.	Very slightly	.....	.....	61
Not suscep.	Moderately	.....	.....	62
Almost immune	Slightly	.....	.....	63
Almost immune	Seriously	.....	Not suscep.	64
Slightly	Slightly	Quite suscep.	.....	65
At times suscep.	Not suscep.	.....	.....	66
Slightly	Somewhat	.....	.....	67
Very suscep.	Very suscep.	.....	Not suscep.	68
Moderately	Moderately	.....	?	69

TABLE I.—Continued

	Variety	Diseases		
		Black rot of fruit and canker	Fungus fruit spot *Phoma* (*Cylindrosporium*) *pomi*	Rust
1	Arkansas	?	Slightly	
2	Arkansas Black	Slightly	After maturity	
3	Astrachan	Rather suscep.		
4	Babbitt	Slightly	Moderately	
5	Baldwin	Moderately	Occasionally	
6	Baltimore		Occasionally	
7	Banana	?		
8	Belmont	?		
9	Ben Davis	Very suscep.	Very slightly	Moderately
10	Bentley (sweet)	?	After maturity	
11	Bietigheimer	?		
12	Boiken	?		
13	Bough (sweet)	Slightly		
14	Delicious	Not suscep.	Slightly	
15	Duling	?		
16	Early Harvest	Rather suscep.	Moderately	
17	Early Strawberry	?		
18	Ensee	?		
19	Esopus Spitzenberg	Very suscep.		
20	Fallawater	Slightly		
21	Gano	Probably suscep.		?
22	Golden Sweet	?		
23	Gravenstein	?		
24	Greenville	Quite suscep.	Very seriously	
25	Grimes Golden	Quite suscep.	Seriously	
26	Hubbardston	Serious on maturefruit	?	
27	Ingram	?		
28	Jefferis	Not suscep.		
29	Jonathan	Slightly		Foliage suscep
30	King David	?	Moderately	
31	Lankford	?		
32	Late Strawberry	?		
33	Livland Raspberry	?		
34	Lowell	?		Somewhat
35	Maiden Blush	Very slightly		
36	Mann	Quite suscep.	Very suscep.	
37	McIntosh	Sometimes	Occasionally	
38	Minkler	?		
39	Missouri Pippin	Rather suscep.		
40	Newtown Pippin	Quite suscep.	Probably suscep.	
41	Northern Spy	Very suscep.	Moderately	
42	N. W. Greening	?		
43	Ohio Nonpareil	?		
44	Oldenburg	Cankers frequent		
45	Oliver Red (Senator)	?		
46	Ralls Janet	Very suscep.		
47	Rambo	Quite suscep.	?	
48	Red Canada	Very suscep.	Moderately	
49	Red June	?		
50	R. I. Greening	Moderately	Very seriously	
51	Rome Beauty	Moderately	Very slightly	Very suscep.
52	Roxbury Russet	Moderately		
53	Salome	Very suscep.	Very suscep.	
54	Smith Cider	Very suscep.		
55	Stark	Rather suscep.	Quite suscep.	
56	Stayman Winesap	Slightly	Slightly	Not suscep.
57	Summer Rambo	?		
58	Sutton	Quite suscep.	Slightly	
59	Tompkins King	Moderately	After maturity, very suscep	
60	Wagener			
61	Wealthy	Very slightly		Foliage suscep.
62	White Pippin	Quite suscep.	Susceptible	
63	Williams	?		
64	Winesap	Slightly	After maturity, very suscep.	
65	Winter Paradise (sweet)	?		
66	Wolf River	?		
67	Yellow Bellflower	Moderately	Moderately	
68	Yellow Transparent	Quite suscep.		
69	York Imperial	Very suscep.	Slightly	

TABLE I.—Concluded

Diseases		Special characteristics or weaknesses	
Physiological fruit spot or Baldwin spot	Water-core		
Occasionally	.....	Good tree	1
Seldom	.....	Good tree	2
.....	.....	Susceptible to scab. Shy bearer when young	3
Seldom	.....	Good grower	4
Very suscep.	.....	Late and biennial bearing. Winter injury	5
.....	.....	Susceptibility to blight	6
?	.....	High-priced market variety	7
?	.....	Dying of branches. Fruit variable	8
Not suscep.	.....	Susceptibility to blister canker	9
Not suscep.	.....	Susceptibility to bitter rot	10
.....	.....	Fruit too large to mature on tree	11
.....	.....	Hardy tree; productive	12
Not suscep.	.....	.....	13
Not suscep.	Very suscep. 1915	Water-core in early season. Good tree	14
.....	.....	Blight on immature fruit very bad	15
Sometimes	.....	Susceptibility to scab	16
?	.....	.....	17
.....	.....	A good keeper	18
.....	.....	Splitting of crotches and sunscald	19
Quite suscep.	Quite suscep.	Good tree	20
Not suscep.	.....	Possibly blister canker	21
Sometimes	.....	Good tree	22
?	.....	Shy bearer	23
?	.....	Storage scald and fruit spot	24
Frequently	.....	Collar rot, especially south	25
Seldom	.....	Tendency to overbear	26
?	.....	Very late bloomer	27
Not suscep.	.....	Of highest quality	28
Very seriously	.....	Weak tree. Susceptible to disease	29
Very suscep. 1912	Very suscep.	Water-core serious	30
Quite suscep.	Inclined	.....	31
?	.....	Good tree and fruitful	32
?	.....	Yet to be tested	33
?	.....	Productive and of high quality	34
Not suscep.	.....	.....	35
Occasionally	.....	Strong tendency to split at crotches	36
Seldom	.....	Tendency to drop before mature	37
Rather suscep.	.....	Good keeper	38
?	.....	Poor tree and fruit	39
Not suscep.	Quite suscep.	Scabs badly	40
Very suscep.	Quite suscep.	Late bearing. Physiological spotting	41
Slightly	.....	Tendency to split at crotches	42
?	.....	Unproductive. Good tree	43
?	.....	Productive. Good tree	44
Quite suscep.	.....	Long storage season. Internal spot	45
.....	.....	Poor grower. Susceptible to scab	46
Slightly	Rather suscep.	Susceptible to scab and bitter rot	47
Not suscep.	.....	Annual bearer	48
.....	.....	High color of fruit	49
Very seriously	.....	Susceptible to twig blight	50
Quite suscep.	.....	Scab susceptibility	51
Quite suscep.	.....	.....	52
?	.....	Not a good keeper	53
Not suscep.	.....	Disease susceptibility	54
Frequently	.....	Blight susceptibility	55
Not suscep.	Quite suscep.	Good tree and fruit. Tendency to water-core	56
.....	.....	.....	57
.....	.....	Twig blight susceptibility	58
Rather seriously	.....	Collar rot and blight susceptibility	59
Not suscep.	.....	Weak grower. Susceptible to blight	60
Not suscep.	.....	Good grower when young. Easily injured by winter	61
Occasionally	.....	Vigorous tree	62
?	.....	Late bloomer	63
Seldom	.....	Scarcity of pollen for fertilization	64
.....	.....	.....	65
?	.....	Shy bearer. Fruit too much in clusters	66
Sometimes seriously	.....	Lack of fruitfulness	67
.....	.....	Susceptible to blight. Bears too heavily	68
Very suscep. 1912	.....	Scalds in storage	69

THE ADAPTATION OF VARIETIES

Considering the varieties of apples as a whole, their adaptation to sections of the country is largely governed by differences in latitude. The apple is sufficiently cosmopolitan with regard to soils to attain at least a reasonable measure of success in any soil adapted to general farming, and in many locations not suited to field crops. This is shown by the response of the orchards over the entire State to pruning, spraying and fertilizing where proper methods of orchard practice are followed.

Since commercial orcharding in recent years has become a more highly specialized enterprise than that of general farming, orchards are being planted in locations affording a combination of the greatest possible number of favorable factors. Among these we must consider climate, soil, location with respect to proximity to bodies of water, or to the elevation above the immediately surrounding country, proximity to markets and facilities for transportation.

The varieties of apples, as such, are directly related only to climate and soil. This relation has not been as well understood by the majority of fruit growers as it should have been. The blame for many failures with certain varieties, or even with entire orchards, has been laid upon climatic influences or upon natural variations of soil, when a change of culture or an addition of the proper fertilizing material would have corrected the fault.

A soil may be so fertile that an excessive wood growth will result, which usually means a reduction or possibly the entire absence of fruit bearing. On the other hand, a soil may be so lacking in one or all of the important elements of plant food that the trees make but little growth in a season besides unfolding the first leaves and maturing another bud on each spur for the following year's growth.[1]

When the season of growth and ripening is not of sufficient length for properly maturing a variety, as will be mentioned in the descriptions of some of the varieties adapted to the southern states, the case shows plainly that the adaptation is primarily climatic, and the difficulty cannot be overcome except at a prohibitive expense.

Apple sections of Ohio: In the list of varieties for the sections of Ohio, given in the following tabulations, climatic adaptation and topography as affecting the climate have been practically the only considerations aside from the actual quality of the varieties. A column has been included in this tabulation indicating the season

[1]Ohio Agr. Exp. Sta. Bul. 240.

of maturity either on the tree or in the cellar storage, as determined by tests made at the Station, in order to give a better understanding of the relative seasons of the varieties.

The sections indicated on the accompanying map cannot be considered as such an accurate division that a variety succeeding in a county in one section could not be expected to succeed in an adjoining county of another section. A liberal interpretation must be given, and the sections outlined should be considered as suggestions indicating the part of the State in which certain varieties will be more likely to succeed than others.

In adaptation to climatic conditions, there could be but two sections plainly defined: the northern, including sections 1, 2 and 3; and the southern, with the remaining sections. The first might be termed the "Baldwin section"; the second, the "Rome Beauty section."

In making a topographical division only two sections could be made, but they would not correspond to the climatic division. The level and slightly rolling areas of the State are included roughly in sections 1, 2 and 4, with parts of 3 and 5. The rolling and hilly sections might be termed the "southeastern half" of the State.

For a more complete understanding of the map it seems necessary to indicate briefly the reason for making each subdivision:

Section I. This is the true Baldwin section. It is largely within the zone in which the equalizing effect of the water of Lake Erie upon the prevailing temperature of the adjacent land is felt.

Section II. The "northwestern plains" part of the State constitutes the second section. It is practically level, with no opportunity to avoid late spring frosts by planting on an elevated site, as can be done in the larger part of *Section III*, where the rolling land affords many hilltops and slopes of sufficient elevation above the surrounding country to secure the necessary air drainage.

Section IV. The adaptation of the more southern varieties to this section serves to distinguish it from Section II. It is also more rolling in topography than the plains of the northwestern counties.

Section V. The adaptation of the Rome Beauty and other varieties requiring a long season for proper development is noticeable in this section. A large part is rolling or even hilly.

Section VI. This is the true Rome Beauty section. Where the system of farming has not been such as to favor the excessive erosion, and depletion of fertility so often found in the hilly section of Ohio, numerous locations can be found which are much better adapted to fruit growing than to ordinary farm crops.

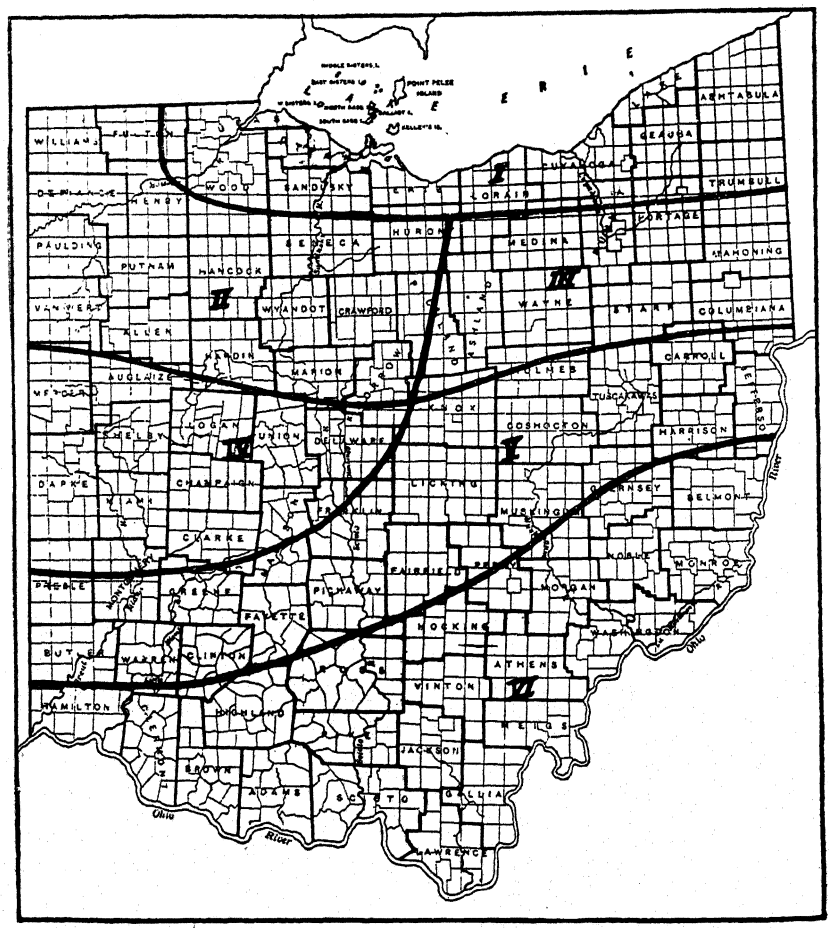


Fig. 1. Apple sections of Ohio.

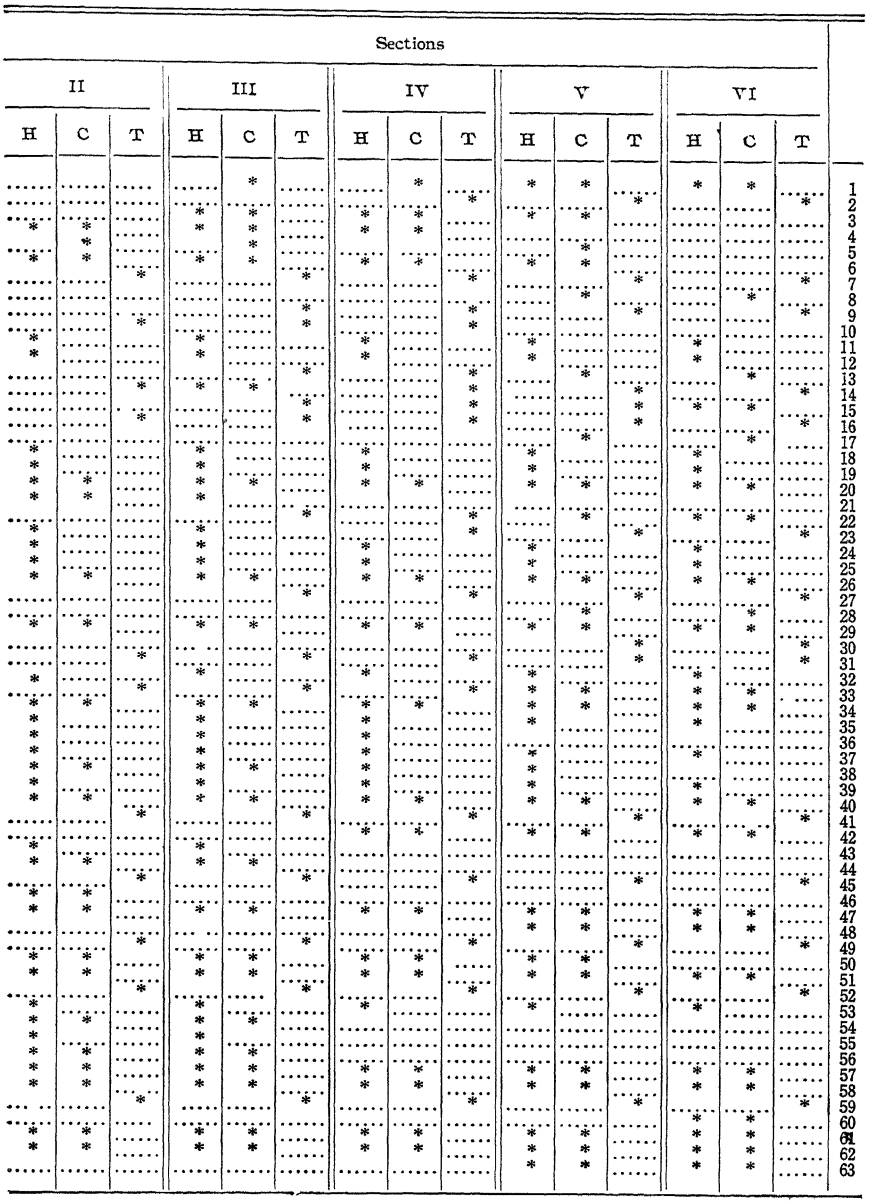
Explanation of Table II. In the accompanying tabulation of varieties, the columns under "Sections" are subdivided under "H," varieties for home use or local market; "C" for commercial planting, and "T" recommended for trial. In making use of the table the following method might be suggested: For example, a list is to be made of commercial varieties adapted to Section VI. Follow column C, under Section VI, note the varieties opposite which asterisks (*) appear in the column, and refer to the descriptions of these varieties for an understanding of their respective merits.

It will be noted that the summer and fall varieties are indicated in almost every case as adapted to all parts of the State. This is due to the fact that the climatic factor is of much less importance with summer and fall varieties than with winter varieties. In addition to this the reports sent to this Department from fruit growers of the State agreed so generally upon the list of early varieties given in the table, that it is considered advisable to give a general recommendation for these varieties.

TABLE II. Adaptation of varieties to sections of Ohio

	Variety	Maturity	Section		
			I		
			H	C	T
1	Arkansas	March			
2	Arkansas Black	April			
3	Babbitt	January		*	
4	Baldwin	January		*	
5	Baltimore	January		*	
6	Banana	December	*	*	
7	Banks	Late August			*
8	Ben Davis	March			
9	Ben Hur	April			
10	Boiken	December			*
11	Bough (sweet)	Early August	*		
12	Chenango	Late August	*		
13	Collins	April			
14	Delicious	December			*
15	Ensee	January			
16	Fanny	Late August			*
17	Gano	March			
18	Golden Sweet	Mid-August	*		
19	Gravenstein	Late August	*		
20	Grimes	November	*	*	
21	Hubbardston	December	*	*	
22	Ingram	March			
23	Isham (sweet)	October	*		
24	Jefferis	Early September	*		
25	Jersey Sweet	Early September	*		
26	Jonathan	December	*	*	
27	King David	January			
28	Lankford	February			
29	Late Strawberry	Late August	*	*	
30	Linville	February			
31	Livland	Late July			*
32	Lowell	Late August	*		
33	McIntosh	Early September			*
34	Maiden Blush	Early September	*	*	
35	Mother	Mid-September	*		
36	Moyer	November	*		
37	Munson (sweet)	Late August	*		
38	Northern Spy	October	*	*	
39	Ohio Nonpareil	Late September	*		
40	Oldenburg	Early August	*	*	
41	Oliver Red	December			*
42	Ralls	March			
43	Rambo	October	*		
44	Red Canada	January	*	*	
45	Red June	Late July			*
46	Rhode Island	October	*	*	
47	Rome Beauty	February			
48	Roxbury	March			
49	San Jacinto	Late August			*
50	Stark	January	*		
51	Stayman Winesap	January	*		
52	Summer King	Late August			*
53	Summer Rambo	Early September	*		
54	Sutton	December	*	*	
55	Tompkins King	November	*	*	
56	Wagener	December	*	*	
57	Wealthy	September	*	*	
58	White Pippin	March	*	*	
59	Williams	Early August			*
60	Winesap	March			
61	Winter Paradise (sweet)	January	*	*	
62	Yellow Transparent	Late July	*	*	
63	York Imperial	March			

TABLE II.—Concluded



QUALITY IN APPLES

Dessert quality: A number of characters are included in the combination of texture, flavor and aroma which we term "dessert" quality. An important element in any case is the personal taste of the apple consumer. A variety which may be unusually pleasing to one person is not always relished by another. This fact is sufficient justification for the propagation of the large number of varieties now cataloged by nurserymen, that the many and various tastes for dessert fruit may be suited.

In the discussion of flavor and quality in the various descriptions, the terms sweet, insipid, subacid and acid are readily understood. The modification, as sprightly subacid, means that the acidity is distinct but not sufficient to become unpleasant. Sharply acid is unpleasant to the majority of persons. Vinous subacid is that in which a wine-like pungency is noticeable as the apple is eaten.

Aroma is difficult to define. It may be considered as that part of the flavor which is perceived through the sense of smell. It may be mild, pleasant, rich, perfume-like, peculiar or unpleasant, and a good part of the enjoyment of apple eating depends upon the character of the aroma.

The texture also varies greatly. The majority of persons prefer an apple of tender fine-grained flesh, with more or less crispness. The coarse sponginess of an immature Ben Davis is largely responsible for the general disrepute of the variety among apple consumers.

The refreshing quality of apples depends largely upon the degree of juiciness. A dry, spongy or mealy apple is unsatisfactory to most persons. There are a few varieties, however, which have so much juice that they must be termed "watery." The combination of tenderness and juiciness, which leaves no pulp in the mouth to be swallowed separately, is satisfactory to most apple eaters.

Culinary quality: Personal tastes also enter very largely into the consideration of the quality of an apple for culinary purposes. Any apple worthy of the name will "cook," but it depends very much upon the use that is to be made of the cooked fruit as to the desirability of the variety for culinary use. Apple sauce is usually considered as a product in which the fruit cooks up completely, and shows no evidence of lumps or fibers. Some persons have no objection to the retention of form by the pieces, and prefer stewed apples to sauce. A light or golden-yellow color of the cooked fruit adds much to the attractiveness of the product.

For use in pie or dumplings, conditions are somewhat different, since the fruit is subjected to heat while inclosed in a relatively small space, and by a material which favors the retention of the natural aroma. There must be a definite relation between the length of time required for properly baking the crust of a pie and the time necessary for the fruit to be cooked to the desired consistency, in order to obtain the most satisfactory results. An apple that cooks quickly to a fine sauce is perhaps less desirable for use in pie than a variety which requires a little longer time, or in which the form of the pieces is more readily retained. In case the variety available requires a long period of cooking, it can be prepared by a preliminary cooking before placing in the pie.

The baked apple, if prepared without removing the skin, is subject to conditions somewhat similar to those of pies or dumplings, in that the skin aids in the retention of the aroma. The general preference is for an apple which largely retains its form, but is tender without becoming pasty. An apple with an excess of fiber, from which the juice is extracted by baking, is very unsatisfactory.

Jelly making: The making of apple jelly depends upon a different set of factors than those governing the other methods of preparation. To quote from an excellent treatise[1] on the cooking qualities of apples, "The correlation between the cooking qualities of certain varieties of apples for sauce and the same varieties of apples for jelly is very small. * * * * It affords reason for believing that both texture and flavor of apple jelly is almost entirely dependent upon the chemical composition of the fruit rather than upon its texture or anatomical structure, and that the chemical compounds which give character to jelly are different from those which give flavor to sauce."

The more highly colored varieties of the Winesap group, especially Winesap and King David, make a jelly of good quality; and, if, as is usually done, the skin is not removed before cooking, a beautiful pink coloring is developed in the jelly. The light-colored varieties, which discolor quickly when the cut surface is exposed to the air, usually make a dull, brownish-colored jelly. A rich, subacid or acid flavored apple seems necessary if the juice is to endure the prolonged boiling and to retain a good flavor in the finished product.

The making of marmalade and apple butter results in a greater concentration of the solids of the apples, and serves to reduce the differences in quality among the varieties so that many of them can be used for these preparations which are unsatisfactory for

[1]Ore. Agr. Exp. Sta Bul 124, p 18.

other purposes. However, a person of discriminating tastes will find sufficient difference to justify an attempt to secure apples which produce marmalade or butter of the best texture and flavor.

Cider making: The making of apple cider, both fermented and unfermented, with the further process of vinegar making, is the basis of an industry of large aggregate proportions; and, since it utilizes fruit which is otherwise a waste product of the orchard, it is related to the varieties of apples to a less extent than the preparation for culinary use. If varieties can be selected, the rich flavored subacid varieties are to be preferred.

The following publications relating to cider making and kindred subjects are available from the U. S. Department of Agriculture, Washington, D. C.: Bulletin No. 71, Bureau of Chemistry, "A Study of Cider Making," Wm. B. Alwood; Bulletin No. 118, Bureau of Chemistry, "Unfermented Apple Juice," H. C. Gore. Bulletin No. 258 of the New York Experiment Station, Geneva, N. Y., "Making Cider Vinegar at Home," is also valuable.

Evaporated apples: Evaporated apples are produced by another industry, which makes use mostly of the lower grades of fruit. The quality of the dried product depends directly upon the quality of the variety used, and there are a few peculiarities of certain varieties which make them especially desirable for evaporating. In "Evaporation of Apples," by H. P. Gould,[1] Northern Spy, Baldwin, Gravenstein, Porter, Esopus, Hubbardston and the Russets are mentioned as desirable varieties for evaporation. The varieties which discolor the least when the cut surface is exposed to the air are desirable where the appearance of the dried fruit is important. Since the development of the canning industry, dried apples are being placed in competition with the product of the canneries.

Mincemeat: The use of apples in the manufacture of mincemeat seems to require a variety which will easily retain its form when cut in small pieces, and thereby retain its identity among the other ingredients used. Ben Davis and other varieties of the same class would be suggested by this because of their texture.

Explanation of Table III: The accompanying tabulation of varieties for specific uses is based largely upon cooking tests conducted by Mr. and Mrs. Paul Thayer with samples of varieties furnished from the Station orchard. The varieties recommended for jelly making are mostly from a list in the Oregon bulletin previously mentioned.

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[1]Farmers' Bulletin 291.

TABLE III. Quality in apples

	Variety	Season	For dessert	Culinary uses				
				Sauce	Stewed	Pie	Baking	Jelly
1	Arkansas	February-May	*					
2	Arkansas Black	April-June			*		*	*
3	*Astrachan	Early August		*				
4	Babbitt	December-March		*				
5	Baldwin	December-March	*		*	*	*	
6	Banana	December-February	*	*				
7	*Benoni	Early August	*					
8	Blenheim	September-October		*				
9	Boiken	December-February		*				
10	Bough (sweet)	Early August	*					
11	Chenango	Late August	*					
12	Delicious	December-January	*				*	
13	Ensee	January-March	*		*			
14	*Fall Pippin	Late September	*					*
15	Garden Royal	Early September	*		*		*	
16	Golden Sweet	March-August	*				*	
17	Gravenstein	Late August	*			*		
18	Grimes	October-March	*		*	*	*	
19	Hubbardston	November-February	*		*			
20	Ingram	March-June	*					
21	Isham (sweet)	Early October	*				*	
22	Jefferis	Early September	*			*	*	
23	Jersey Sweet	Early September	*					
24	Jonathan	December-March	*		*	*	*	*
25	King David	January-March	*		*			*
26	Late Strawberry	Late August	*		*	*		
27	*Lawver	March-May						*
28	Lowell	Late August	*					
29	McIntosh	Early September	*					
30	Maiden Blush	Early September	*					*
31	*Melon	Early September						*
32	Mother	Mid-September	*		*	*	*	
33	Moyer	November-February	*		*			
34	Munson (sweet)	Late August	*		*			
35	Northern Spy	October-January	*		*	*	*	*
36	Ohio Nonpareil	Late September	*				*	
37	Oldenburg	Early August		*				
38	Oliver Red	December-April	*		*		*	
39	Ralls	February-May	*					
40	Rambo	October-December	*	*			*	*
41	Red Canada	November-March	*			*		*
42	Red June	Late July	*			*	*	
43	Rhode Island	October-December	*		*	*		
44	Rome Beauty	January-March			*		*	
45	Roxbury	February-May	*					
46	San Jacinto	Late August	*					
47	*Scott	February-May						*
48	Stark	January-April	*					
49	Stayman Winesap	January-May					*	
50	Summer King	Late August	*		*			
51	Summer Rambo	Early September	*					
52	Summer Rose	Late July	*					
53	Sutton	November-February	*		*		*	
54	*Sweet Russet	Early October	*				*	
55	*Sweet Winesap	November-December	*		*		*	
56	Tolman (sweet)	November-January	*				*	
57	Tompkins King	October-December	*	*			*	*
58	Wagener	December-February	*					*
59	Wealthy	September			*	*		
60	White Pippin	February-May	*				*	
61	Winesap	February-May	*		*	*	*	*
62	Winter Paradise (sweet)	January-March	*					
63	Yellow Transparent	July	*	*				
64	York Imperial	February-May			*			

*Varieties not described in this bulletin.

A difference is made in the second column of the table under "Season," from the corresponding column under "Maturity" in the tabulation of varieties adapted to the sections of Ohio appearing on pages 46 and 47 of this bulletin. The "Season" is meant to include the entire period of usefulness of the variety. "Maturity" is meant to indicate only that part of the season in which the fruit is at its highest degree of quality. Both are based upon dates of picking and storage test records obtained in the Station orchard and storage rooms.

EXPLANATION OF TERMS USED IN THE DESCRIPTIONS OF VARIETIES OF APPLES

It has been considered inadvisable to burden this publication with strictly technical descriptions of the varieties of apples. The style of description used might be properly termed a "commercial description," and discussions of many points of form and structure of both tree and fruit have been omitted. The fullest descriptions have been given in case of important new or little-known varieties, and, on the other hand, very brief descriptions of the well-known varieties and those of minor importance.

The full descriptions follow most closely the style used in "Apples of New York," Vols. I and II, by S. A. Beach.

An effort was made in every case to write a description in which the points directly interesting to fruit growers should be made prominent, so that the publication might be of the most practical use to them.

Branching habit: In describing apple trees, the habit of growth of the branches is perhaps the most plainly distinguishable character, and the most valuable when the identity of a variety becomes a matter of the difference in tree growth between two varieties. The branches may be upright, divergent, spreading, horizontal or drooping; and, if early training has been more or less neglected, the branching habit is quite certain to be characteristic. "Stout" refers to the thickness or diameter of the branches and not to the strength of the wood.

Vigor of tree: A tree may be vigorous, moderately vigorous, or of slow or weak growth. The vigor of the tree is much modified by the character and fertility of the soil, by disease, such as crown gall, or by various insects. Therefore "vigorous" is only relative, and is most intelligible by comparison, as between Baldwin and Wealthy, or Northern Spy and Jonathan.

The color of the older bark is a distinct feature of many varieties, and ranges from the distinctly yellowish cast of the Yellow Transparent through the various grays, olive shades, browns, to the purplish gray of the Black Ben. The color of the twigs may resemble that of the older bark, but this is not always the case.

The size, color and texture of the leaves vary more or less with the vigor of the tree. When a tree is bearing a full crop of fruit, the leaves are often much smaller than when no fruit is produced. Disease or lack of fertility may cause a yellowish-green color of leaves which are normally a deep green. However, the gray-green of the leaves of Jonathan, as compared with the dark green of Baldwin, or the yellow-green of Yellow Transparent, is sufficiently marked to serve as a distinguishing characteristic.

To aid in understanding the discussion of the sizes of trees in the Station orchard, a few approximate dimensions may be of service: A vigorous Baldwin tree at 21 years from planting has a spread of branches of 35 feet and a height of 25 feet after regular pruning and considerable heading back. A Northern Spy under the same conditions will average somewhat higher, but not so wide in spread of branches. A Grimes tree will measure somewhat less than that of Baldwin of the same age. Jonathan trees measuring 25 to 30 feet in breadth and 20 feet in height at 20 years from planting may be considered of a good size. Delicious trees at 14 years from planting measure 16 to 20 feet wide, and, if not headed back, will be 20 or 25 feet high. A Wealthy tree will be but little, if any, larger at 20 years than a Baldwin at 14 years.

Descriptions of the fruit: The accompanying plate showing cross sections of apples illustrates a number of characteristics commonly considered when describing apples.

a. *Christmas Banana,* a local seedling sent to the Department during the past season. The following characters may be emphasized: Size large; form globular, symmetrical; stem medium to long, rather stout; cavity wide, deep, russeted; calyx and basin very small; core rather large, open.

b. *Chenango.* Size large; form oblong, inclined to ovate or "egg-shaped"; stem rather short; cavity large, smooth; calyx large; basin shallow; core large, partly open.

c. *Lawver.* Size medium; form roundish-oblate; stem long, rather slender; cavity large, furrowed, russeted; basin and calyx of medium size; core large, open.

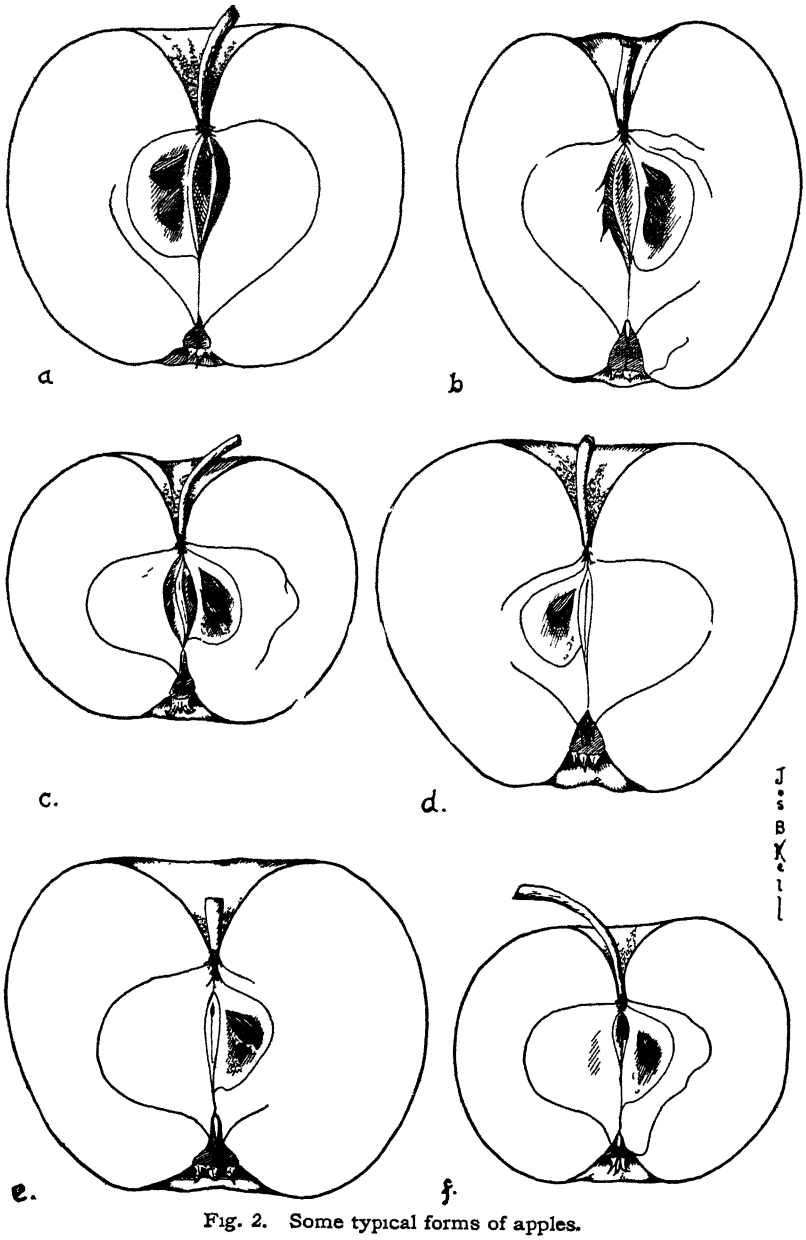

Fig. 2. Some typical forms of apples.

d. *Buckingham.* Size large; form roundish-conical, with broad base, (base the "stem end," apex the "blossom end"); stem of medium length, slender; cavity wide, deep, slightly russeted; basin wide, deep, furrowed; calyx rather large, open; core small, closed.

e. *Sierra.* Size large; form roundish-oblate, inclined to conic, with a very broad base; stem very short, stout; cavity very wide, deep, smooth or slightly russeted; calyx large, wide open; basin very wide, rather shallow, furrowed; core small, closed.

f. *Golden Sweet.* Size medium to rather small; form oblate to roundish-oblate; stem very long, slender; cavity and basin of medium size; calyx small, closed; core of medium size, nearly closed.

In many cases size in any part of the fruit is a relative term, and must be considered as related to the average size of the apple as a whole; for example, the core of "f" is described as of medium size, but the same size of core in a large apple, such as "e," would be considered small. To be a little more definite with regard to size of the apple as a whole, the following approximate dimensions are given: Size small—diameter below 2½ inches; medium—2½ to 3 inches; large—3 to 3½ inches; very large—3½ to 4 inches or larger.

Some of the terms used in describing the texture, surface and color of the skin are easily understood, while some of the characters are difficult to describe with any terms commonly used. A few of the terms which may not be readily understood are as follows:

Scarfskin—A superficial layer of cells usually grayish in color which greatly modifies the coloring of some apples, appearing in streaks, usually on the base of the apple. Pumpkin Sweet is a good example of this. Sometimes the surface is marked with a network of minute cracks, which give the apple a dull appearance, as the Winesap, for example.

Bloom—A very thin, whitish, waxy coating, covering the entire apple in some varieties, of the same character as the coating of "bloom" on plums and nectarines, as, for example, McIntosh.

Coloring—The many shades of red, yellow and green found in apples would be difficult to describe if the names of the exact shades of color were to be used. As much as possible, names of shades which are used in common speech, were used in the descriptions.

The term "red" is not often used because red is a primary color and not a shade. Light to deep pink, shading into light to deep crimson, thence through the shades of carmine or purplish-red to the deep-wine color and almost black of some varieties is the range of the red coloring of apples. The shades of green in immature apples are modified in nearly all varieties to shades of yellow when

maturity is reached, and are often described as "undercolors" when shadings of red are also present.

A "blush" is a continuous shading without any suggestion of stripes. "Mottled" is an uneven distribution of coloring.

A "stripe" is a narrow band of coloring extending over the surface for a large part of the distance from the base to the apex. A "streak" is a short, broken form of stripe. A bronze or brownish coloring appears on some varieties as a shading or blush.

ARKANSAS

The Arkansas, better known as the Mammoth Black Twig, is a late-keeping apple of the Winesap group. The variety originated in Arkansas, and, when well grown and mature, it is an attractive dark-red and yellow, firm-fleshed apple of good quality.

It is said to be a seedling of Winesap, which it resembles in both form and coloring, though averaging considerably larger.

As might be judged from its southwestern origin, it is a variety requiring a long season for best development of color and quality, and is better adapted to the southern part of Ohio than elsewhere in the State.

The tree is of vigorous growth, with strong, rather stocky branches, divergent to spreading in habit, the lower branches being inclined to trail on the ground when fruit bearing becomes established. Growth is somewhat open, easily pruned, and does not require much heading back to maintain a low top. Twigs are stout, with bark of a dark brownish-red color. The older bark on the main branches becomes a very dark brownish-gray, nearly black. Foliage is rather dense; leaves are large and numerous. The period of bloom in the Station orchard in normal seasons extends from May 3 to 9. The fruit is ready to pick for storage the last week of October.

The bearing habits of Arkansas are rather uncertain. A first crop of one-fifth bushel has been recorded for a tree in the Station orchard in its eighth year from setting, but heavy crops seem unlikely before the fifteenth year. Alternate heavy and light crops have been produced by mature trees in the same orchard, but thorough thinning was necessary to attain the best size and coloring of the fruit. Experience with this variety in the South and Southwest has indicated, in general, a lack of productiveness.

The tree is not subject to disease in the Station orchard. In fact, it is one of the healthiest of all the varieties grown here, and would seem to be highly valuable as a stock for top-grafting with

weaker varieties. The tree is nearly free from blight. The leaves and fruit are susceptible to apple scab, but under the modern methods of spraying this disease is almost overcome.

Fruit is medium to large; form roundish-oblate, inclined to conical; stem medium in length, rather slender; cavity rather narrow, moderately deep, russeted; calyx small, closed or partly open; basin narrow, shallow, regularly furrowed, like that of Winesap; skin thick, tough, smooth, glossy except where covered by the heavy scarfskin, which is minutely net-veined, making it feel harsh to the touch. The surface becomes more or less oily in storage. The ground color is a dull yellow when mature, nearly covered with dull red to deep crimson, faintly marbled on the light-colored side. Flesh is yellowish, tinged with green, firm, crisp, moderately juicy; flavor rather rich subacid, pleasing; quality good to very good if well grown and properly matured in storage.

At picking time this apple is very hard and will bear considerable handling without serious injury. It reaches maturity and full color in cellar storage by the last of March, and will often remain in good condition until June, if the cellar is kept cool. A serious weakness of the variety is a tendency to scald in cold storage, and, if the scalding is severe, the apples are quickly destroyed by decay.

As a dessert apple it is inferior to Stayman Winesap, but has a later season, and, in common with the other varieties of this group, maintains its quality well after maturity. As a culinary apple it is unsatisfactory for sauce, but good for pie and baking.

It is generally less desirable than Stayman Winesap in quality and productiveness, but later in season and more vigorous in tree. Present knowledge of the variety does not warrant recommending it for extensive planting in Ohio, especially in the northern part.

ARKANSAS BLACK

This is another variety originating in the state of Arkansas, and is similar to the preceding variety in adaptation and commercial value. The usual rich, dark color attracts much attention wherever this variety is exhibited, though some growers have expressed the opinion that the apples are "too nearly black" to be attractive.

The long season required for its development in this locality indicates that more southerly latitudes would be better for this variety.

The tree is large and vigorous, making an open, upright growth, with spreading lateral branches, easily pruned into a shapely top. Branches are long, straight, strong, bearing the crops of fruit

easily; twigs stout, reddish, or purplish brown, covered with a heavy scarfskin, resembling those of Winesap; leaves medium to rather small, of heavy texture, dark green. The period of bloom in the Station orchard extends from May 4 to 10. The fruit is ready to pick for storage the last week of October.

The bearing habits of this variety, as observed in the Station orchard, have given a rather variable record. The youngest tree to come into bearing produced its first light crop at 7 years from planting, while an older tree began bearing at 12 years. An average of 12 bushels a year has been produced during the last 4 years by trees now 22 years from planting, in crops ranging from 2 to 31 bushels.

These trees have apparently established the habit of bearing annually, with alternate heavy and light crops. In the South and Southwest the variety has the reputation of being rather unproductive.

In common with the other varieties of the Winesap group, Arkansas Black is susceptible to attacks of the apple-scab fungus, but is practically free from blight and other diseases of apple trees. The fruit is sometimes attacked by the fungus fruit-spot, but not until after maturity.

Fruit is medium to rather large; form roundish-oblate to globular; stem medium in length, slender; cavity rather narrow and deep; calyx small, tightly closed; basin very small, regularly furrowed like that of Winesap; skin thick and tough, smooth and glossy, except where covered with scarfskin, which is not conspicuous aside from the dull appearance, the surface becoming very oily in storage, which is nearly a complete preventive of shriveling. Dots are numerous, small and yellow. Ground color is orange yellow, nearly or quite covered with dark-red to deep-wine color, sometimes nearly black. Core is medium to small, nearly closed; flesh of rich yellow color, very firm, rather coarse and granular, moderately juicy; flavor rich subacid, with a peculiar aroma; quality fair to good, becoming desirable as a dessert apple only after full maturity, which is reached in late winter or early spring in cellar storage, while in cold storage the apples may be kept in good condition for more than a year after picking. For culinary purposes this apple is highly satisfactory where its tendency to remain in whole pieces after cooking is not objectionable. The rich flavor and yellow color of the flesh persists, while the peculiar aroma is largely modified.

Arkansas Black is very hard at picking time, and is one of the best of keepers with ordinary care in handling. Under conditions in which White Pippin and Greenville scalded badly, Arkansas Black

remained in the best of condition. It does not bear handling well after maturity, when injuries quickly develop into decay. Under proper conditions of storage, Arkansas Black will retain good quality for a long period after maturity.

As a late-keeping, highly colored apple, of fair quality for dessert when mature, and good for culinary uses, this variety comes into a place in apple culture occupied by few other varieties.

Not having been planted extensively in this region, the adaptability of the variety to our conditions has not been well established. However, it seems well worthy of more extensive trial, especially in the southern half of the State and on the highest hills.

BABBITT

This variety, also known as the Western Baldwin, originated more than 60 years ago, as a seedling of Baldwin, in Woodford County, Illinois.

Babbitt is not generally known in this State. Aside from being grown in the Station orchard, it was reported from only three counties of Ohio in 1912. It has several points of excellence, which should be more generally known, and for certain uses it should be more widely planted.

The trees make a large, open growth, very thrifty and free from disease. The branches are long, stout, divergent, with laterals often in whorls at regular intervals. The wood is tough and strong and seldom breaks under the heavy crops often produced. The open growth precludes the necessity for much pruning, except for thinning fruit and heading back, which is made necessary by the habit of growth of the leading shoots, in growing upwards, while the whorls of lateral branches develop. The older bark is gray. Twigs are stout, maroon; leaves medium to large, of heavy texture, dark green.

The period of bloom in the Station orchard is May 3 to 8. The fruit is ready to pick by the middle of October, but seems to hang on the tree exceptionally well, giving a range of a week or ten days for the picking season. The exceptionally short stem makes the apples difficult to pick unless well ripened on the tree.

As grown in the Station orchard, Babbitt has been unusually productive in alternate heavy and very light crops. The four trees, now 22 years from planting, have produced an average of nearly 11 bushels each per year for a 5-year period.

There seems to be imperfect pollination of blossoms of this variety. The setting of bloom for a full crop is usually very heavy,

but so many of the blossoms fall before making any development that thinning is seldom necessary.

The fruit is medium to large, oblate, usually symmetrical, ribbed, sometimes angular or elliptical; stem very short, stout; cavity rather large, with furrows extending out over the base; calyx medium sized; basin wide, deep, irregularly furrowed; skin thin and rather tough, very smooth, glossy when polished, very oily, which is noticeable even at picking time, and increases in storage. Color is rich yellow, shaded and streaked with bright pink to deep crimson, making a very attractive coloring. Flesh is white, firm, somewhat coarse, crisp, juicy, becoming mealy when overripe; flavor sharp acid; quality good; season early to midwinter. The form and coloring give it a striking resemblance to a highly colored Wagener.

As a dessert fruit, this apple will be chosen only by those who relish the exceedingly acid flavor. For culinary purposes it is highly satisfactory, requiring about one-half the usual time for cooking. With the exception of the persistent acidity, making the addition of considerable sugar necessary, Babbitt is good for all culinary uses. For use in pies, the short time required for cooking is a decided advantage.

In cellar storage, Babbitt will keep until March, but is usually mealy at that time. The oily character of the skin completely prevents shriveling, though the apple does not bear handling very well, and injuries soon develop decay.

In cold storage the season is lengthened by several months, and Babbitt may be kept in good condition until June or July, depending largely upon careful handling.

It seems worthy of trial in the northern half of Ohio.

BALDWIN

This variety, originating in Massachusetts about the middle of the eighteenth century, has become, during its general distribution within the last 60 years, the best known of all varieties of apples among growers, dealers and consumers alike.

While its extensive planting in the region east and southeast of the Great Lakes has shown it to be well adapted to that section, the growing of Baldwin elsewhere has met with rather variable results. In Ohio it is well adapted to the counties bordering on Lake Erie, but its successful production as a commercial winter apple does not extend much beyond that area. The usual comment of growers in the central and southern half of the State is that "Baldwin drops badly."

Baldwin makes a large tree when grown in fairly fertile soil, and is often planted 40 feet each way. The rapid early growth does not favor early fruit bearing, and good crops are not to be expected until 10 or 12 years from planting.

The most serious weakness of the tree appears to be the tendency to winter killing in seasons of extremely low temperatures. Injury of this nature appeared in northern Ohio after the extreme cold of the winter of 1911-12; also in October, 1906, which in the case of young trees was extremely disastrous.

What has been commonly termed a weakness is the breaking of branches under heavy loads of fruit. The usual inference has been that the wood is "brash" and the crotches more inclined to split than in case of trees of most other varieties. This may be true when compared with Northern Spy, or other varieties of more slender, flexible growth. There seems to be no reason for serious breaking of Baldwin trees if they are properly trained and pruned, and if the heavy crops are thoroughly thinned.

Baldwin is susceptible to attacks of scab, but not to a serious extent, and, since this fungus is readily controlled by proper spraying, it is not troublesome. Attacks of blight are usually confined to the blossoms, and sometimes destroy a considerable portion of the bloom. The twigs and branches are seldom affected. The canker caused by the black-rot fungus is found in some localities to be a serious disease but has not proved to be so in the Station orchard.

Baldwin is usually considered a strictly biennial bearer, and aside from accidental influences maintains this habit throughout the life of the tree. The possibility of inducing a habit of annual bearing in this variety has been the subject of much inquiry and conjecture, but no definite conclusions have yet been drawn. Rather frequent cases have been observed and reported of trees on which certain branches bore fruit one year, with the remainder of the tree producing a crop the next year, and also of adjacent orchards in which the Baldwin trees in one bore fruit in years alternating with those of the other.

Thinning the fruit of the Baldwin trees in the Station orchard, as conducted the last 4 years, gives some indication that early thinning—4 or 5 weeks after the blooming period—will aid in the setting of fruit buds for the following year. Whether this effect is cumulative and will result finally in the production of a fair crop in the "off year" remains to be determined by the continuation of the test.

The fruit of Baldwin is exceedingly variable in size, form and coloring. The usual heavy crops contain the most typical apples of this variety, and light crops the most variable specimens.

A typical Baldwin is somewhat above medium size, roundish-oblate, inclined to conical, with a rather long slender stem, small, partly open calyx, and a small core with few seeds. Mature apples have a yellow ground color, nearly covered with a rich, dark red. Flesh is yellowish, juicy, with a rich subacid flavor.

The blooming period in the Station orchard is May 4 to 9, and the apples are ready to pick the second or third week in October.

The one important and serious factor in the production of Baldwin apples is the disease known as Baldwin spot. This has been the subject of many inquiries and investigations, which have as yet given no definite light on either cause or treatment. It is apparently a breaking down of the tissues, sometimes visible outwardly as depressions in the surface, and more often beginning deeper in the flesh of the apple causing dry spongy masses, which have a bitter taste, and are brown in color. It seems to be more prevalent in apples from trees growing in poorly drained soil, and in those giving light or moderate crops, or in large overgrown specimens. Unless a remedy for this trouble is to be found, the indications are that Baldwin will sooner or later need to be replaced by some other variety of the same season and quality, which is not affected by the spot. The Baldwin spot is rather easily confused with several other troubles affecting apples, and is also found frequently in a number of other varieties.

BANANA

This variety originated in Cass County, Indiana, about 40 years ago, among a number of seedling trees intended for top-grafting on the farm of David Flory, sr., who, observing the thrifty growth of one of the trees, decided to retain the tree until it bore fruit. It came into bearing quite young, producing fruit which was so pleasing to its owner that he named it "Flory Banana." It was introduced to the trade in 1890, as "Winter Banana," which name has since been shortened to Banana. The original tree is still standing and bore a good crop in 1913.

It has become widely disseminated in Ohio, Indiana and Michigan, and in the apple districts of the Pacific Northwest, where it seems to be growing in popularity as a commercial variety.[1]

[1]Yearbook, U. S. Department of Agriculture (1913), p. 110.

The tree makes a good growth while young, but, after bearing has become established, it is somewhat below the size of the average Baldwin tree of the same age. The mature trees are moderately vigorous, with branches spreading or drooping, making an "umbrella top"; branches rather stout, long, curved. Older bark is yellowish gray, shedding in rather large flakes from the trunk and main branches. Twigs are long, rather slender, light brown; leaves large, of rather light texture, medium green.

The bending of the branches by the frequent heavy crops often exposes the bark to direct sunlight, sometimes resulting in a serious sunscald.

Blight attacks this variety rather seriously in the blossoms and later in the twigs and new growth. The blooming period in the Station orchard is May 5 to 11, a rather late and long season of bloom. The apples are ready for picking during the first week in October, but hang fairly well and may be left a week longer for additional color.

A peculiar circumstance was observed in connection with these trees. Having been purchased under the name of Huntsman, they were not otherwise recorded until younger trees of Banana came into bearing, when their identity was established. The workmen at the orchards were accustomed to gathering these apples in the latter part of September, for sale as fall apples, as in fact they were; for, if not picked, the entire crop would have fallen from the tree before the first of October.

However, with a change in materials used in spraying (Bordeaux mixture to lime-sulphur), the fruit remained on the trees long enough to be gathered as early winter apples. Apparently the only explanation for this is that the Bordeaux spray affected the apples so that they fell from the tree before maturity. This effect has been observed with other varieties where comparative sprayings of the two materials have been made.

Mature Banana trees in the Station orchard have been bearing alternate heavy and light crops annually, and the average yields are among the heaviest recorded during the last 5 years for this orchard. Younger trees show the same habit of alternate bearing.

Thinning has been necessary in all the heavy settings of fruit, and is often desirable with the lighter crops. The short stem favors the early crowding of the clusters causing the premature dropping of fruit so crowded.

Fruit is medium to large, oblate, inclined to roundish or slightly conical, sometimes unsymmetrical or otherwise irregular; stem

medium to long, slender; cavity wide and rather shallow, sometimes with a lip, smooth or sometimes lightly russeted; calyx small, closed or partly open; basin wide, shallow, wrinkled and furrowed, often with one or more suture lines extending from the basin; skin thin and rather tough, very smooth and becoming oily in storage. Dots are numerous, whitish, small and some russet. Color is pale yellow with an orange or brownish-red blush. Seeds are small and numerous; core is large, open; flesh yellowish white, moderately firm, very tender, juicy; flavor mild subacid, aromatic; quality very good; season early winter.

Banana in common storage reaches maturity in December or January, depending on the prevailing temperature after storing. It does not retain its quality long and is often undesirable for dessert in a month after maturity.

Cold storage retards ripening until March or April, and, so far as observed, Banana is well adapted to this method of storage. A tendency to scald has been noted in apples wrapped and packed in boxes or baskets closely lined with paper. This seems definitely related to the lack of ventilation.

This variety must be handled when still firm, as the thin skin and tender flesh are easily injured when mature, and decay progresses rapidly.

As a cooking apple Banana is at its best just before maturity (November or December in cellar storage), and is remarkably good for all uses. It cooks rather rapidly, but does not make a fine sauce as Rambo and Yellow Transparent do. When it becomes mealy, it is unsatisfactory for pie or baking. A general rating of this variety would place it below Grimes for all uses.

As a commercial variety, Banana is desirable for its early-bearing habit, good to heavy crops, good cooking qualities, adaptation to cold storage, and, if carefully handled, its attractiveness when packed in boxes or cartons.

It has been grown successfully in various sections of Ohio, but the finest specimens have been produced in the northwestern part of the State.

For home use Banana furnishes a good culinary apple for early winter, though surpassed by Northern Spy and Rhode Island in the northern half of the State.

BALTIMORE

The old trees of this variety in the Station orchard have been unusually productive. Heavy, almost annual, crops have been produced by trees planted more than 60 years ago, far outyielding

near-by trees of Baldwin, Northern Spy, Grimes and Maiden Blush. There has been a slight uncertainty as to the identity of these trees, but the fruit corresponds very closely to a description of Baltimore as given by Downing,[1] and there seems to be little ground for doubt.

The trees are of moderate to slow spreading growth, retarded greatly by the heavy fruit-bearing. The branches are covered with the fruiting spurs, and are tough and strong. Young trees make a vigorous growth in the nursery row.

The fruit is inclined to be small in the heavy crops. The distinguishing features are the smooth, firm skin and the heavy bluish bloom, with a small, shallow basin and closed calyx. The general color effect is a lilac purple over dark red. A peculiar aroma of the flesh is unpleasant to some persons. The flavor is subacid, regarded by some as pleasing and by others as insipid.

The period of bloom in the Station orchard is May 2 to 8, and the fruit is ready to pick the third week of October.

Maturity is reached in cellar storage in January or February, and the apples keep well through the winter. They are inclined to shrivel and to become tough and leathery.

Though a productive winter apple of good keeping qualities, and grown for many years, it has not gained much in popularity. It is inferior to a number of other winter varieties.

In the orchard of C. E. Pace, of Perry County, Ohio, and also in neighboring orchards, a variety identical with Baltimore as grown at the Station, is known under the name of Pryor's Red. In this section the variety is considered to be highly profitable.

The late Wm. Miller, of Gypsum, Ohio, regarded the Baltimore as one of the most profitable of all varieties grown by him.

BANKS (RED GRAVENSTEIN)

This is a bud sport from Gravenstein, first noticed and propagated by C. E. Banks, of Berwick, Kings County, Nova Scotia, and first reported to the American Pomological Society in 1903.

As grown in the Station orchard the few apples so far produced by a tree now 9 years from planting, while borne on inner branches, have given indications of being more highly colored than the common Gravenstein.

In form and quality of fruit, and in habit of growth, Banks is apparently identical with Gravenstein, to which the reader is referred for a more extended description.

[1] *Fruits and Fruit Trees of America*, p. 86.

BAYARD

This is a very dark red apple, roundish in form and often unsymmetrical. It has a thick, tough skin and yellowish, rather coarse, firm flesh. The flavor is mild subacid and richly aromatic.

The tree is of moderate, rather open growth, and is fairly productive.

Color and flavor are very pleasing in this apple, but further trial is necessary to establish the value of the variety.

BELMONT

This variety is also known as Gate, Mamma Beam and Waxen. The approved name of Belmont was given at the time of its dissemination from Belmont County, Ohio.

Belmont is quite well known in Ohio but has been largely supplanted by other varieties of the same season. As grown on the few old trees in the Station orchard, the fruit is variable in quality, much subject to diseases, and inclined to drop badly. A few growers in northern Ohio have found it profitable, as it ripens later in that section and keeps longer in storage.

The apples are roundish, waxen yellow, sometimes blushed, becoming very oily in storage. The flesh is tender and juicy; flavor aromatic subacid; quality usually excellent, though often variable in fruit from the same tree; season late fall or early winter.

BEN DAVIS

The Ben Davis is a well-known, long-keeping, winter apple which has been widely disseminated. It is considered by most persons as an apple of decidedly inferior quality, and has been made the subject of much ridicule. While its lack of quality has become almost proverbial, a thorough student of varieties of apples will be still unwilling to discard the Ben Davis as having no place in apple culture.

The origin of this variety is not definitely known, being variously accredited to Virginia, Tennessee and Kentucky. An able discussion of this point is given by Prof. R. L. Watts in a bulletin[1] on "Apples of Tennessee Origin." It has been well known and largely planted in the South for more than half a century. Where a long season is possible for its development, it is of considerably better quality than when grown in more northern latitudes. It has been planted in nearly every section of Ohio, having been reported to the Department of Horticulture from 70 counties of the State.

[1]University of Tenn. Agr. Exp. Sta. Vol. IX, Bul. 1, p. 7.

While usually considered to be a healthy tree, Ben Davis is subject to several diseases which attain serious proportions in some of the southern counties of the State. The worst of these is probably blister canker, which is reported as infecting the larger branches and crotches. Collar rot, crown gall, bitter rot, twig blight and blotch have been mentioned as more or less serious diseases of the Ben Davis.

This variety is one of the most productive of all apples. Under favorable conditions alternate heavy and medium crops are produced annually. Three trees in the Station orchard, planted 21 years ago, produced a total of 268.8 bushels in the last 5 years, or an average yearly crop of 17.9 bushels per tree. Profitable crops are often produced at 5 or 6 years from planting. In the course of an experiment[1] in spraying conducted by the Department of Entomology in the orchard of J. A. Stokes, in Sandusky County, Ohio, an acre of Ben Davis, 24 years old, yielded in one year (1908) 288 barrels of picked apples.

Thinning of the fruit is advisable with almost every crop, to which the variety responds with a decided improvement in grade of fruit, as well as in higher and more uniform color.

The fruit is large; form roundish-conical, variable, some nearly globular, others nearly ovate, inclined to be ribbed in apples from a light crop, or when grown on rich soil; skin rather thin, tough, smooth and glossy, becoming very oily in storage; ground color clear yellow, shaded with pink and streaked with crimson to carmine; flesh white, firm, moderately juicy, somewhat coarse and spongy, becoming dry, mealy and nearly tasteless when past maturity; flavor rather insipid, subacid; quality fair if well known. The well-colored apples are always of better flavor than the greenish ones.

The period of bloom in the Station orchard is May 4 to 10, and in ordinary seasons the apples may remain on the trees until the last of October.

Ben Davis will keep in cellar storage until spring, maturing in March. The apples should be used soon after maturity, as the maximum quality has then been reached. A large part of the popular dislike of this variety has resulted from the attempt to use the apples as one uses Baldwins—any time during the winter. Ben Davis has no place in the apple season before its normal period of maturity, which comes at a time when most other varieties have disappeared from the market. Cold storage extends this season until late spring or early summer.

[1]Ohio Agr. Exp. Sta. Cir. 112

As a culinary apple, Ben Davis is most satisfactory for baking. Manufacturers of mincemeat are said to prefer Ben Davis for the apple portion of their product, on account of the little pieces retaining their shape and identity.

Ben Davis has long been known among apple growers as a "money maker," on account of its regular and profuse bearing and late keeping. Its relatively low quality, however, is making it increasingly unpopular, and a few other varieties are coming into use of equally late season and better quality. Cold storage for the earlier varieties lengthens their season so that they cover the period of demand for apples in the spring months.

In connection with this discussion of Ben Davis, it may be well to consider the closely related varieties, Black Ben Davis and Gano. The best statement regarding the differences among the varieties, ever coming to the notice of the authors, was made by the late Prof. H. E. Van Deman, who was judge at the Fourth Ohio Apple Show, held in Zanesville, Ohio, in January, 1913. He said, "Black Ben Davis should be solid dark red with no stripes; Gano is dark in color but may have some stripes, while Ben Davis is always distinctly striped." This is in accord with observations made upon these varieties as grown in the Station orchard. No essential or constant structural differences have been observed in the fruits from the various trees, while the variations in flavor and keeping qualities have been no greater than the variations in fruits from trees of the same variety. The purplish color of the older bark on the trees of Black Ben, and to a smaller degree on Gano, serves to distinguish these from the Ben Davis trees.

Comparisons have been made as to the culinary qualities of Ben Davis and Gano, in which a preference for the latter was expressed by the persons making the test. Black Ben gave somewhat better results as a cooking apple than Ben Davis.

BEN HUR

According to statements made by the introducers, this variety originated with Sanford N. Badger, of Derby, Indiana. It was supposed to be a cross between Ben Davis and Rome Beauty. Upon finding it inferior to Rome Beauty and Ensee as grown in southern Ohio, the introducers are not propagating the variety as much as formerly.[1]

As grown in the Station orchard, Ben Hur gives indications of being an early and abundant bearer. A tree set in 1909 produced its first crop, 1.1 bushel, in 1914. An older tree produced 5.6

[1]Letter from Stark Bros Nurseries & Orchards Co, Jan 28, 1915.

bushels at 9 years from planting. The fruit was fairly uniform in size, with a large proportion of clean, sound apples.

This variety resembles Ben Davis in habit of growth but does not grow as rapidly. The rather slender branches are strong and bear heavy crops safely.

The fruit is large, roundish-oblate, with broad base and apex, wide, deep cavity and basin. The stem and cavity resemble those of Rome Beauty. Coloring is the same as that of a highly colored Ben Davis; flesh white, very firm, juicy; flavor sprightly subacid; quality good, if properly matured. Ben Hur is more acid than Rome Beauty, and retains its flavor longer after maturity. It is a better keeper than Ben Davis and of much better quality at the end of its season, which is late spring or sometimes early summer.

The period of bloom in the Station orchard is May 4 to 10, and the fruit is ready for picking the last week of October.

As a long-keeping winter apple, Ben Hur is superior to any of the Ben Davis class; and, as a better apple than Ben Davis, it seems worthy of more extensive trial in the districts where varieties of this class are successfully grown.

BENTLEY

This is a long-keeping, sweet apple grown in some of the eastern counties of Ohio, and, in common with many other sweet varieties, has gained little recognition.

The apple as grown in the Station orchard is rather small, roundish, with a very smooth skin, green when picked, becoming yellow, and with a dull red blush. Flesh is very hard until matured; flavor sweet. It keeps well into the summer, being one of the latest keepers among the apples tested in cellar storage at the Station.

BLACK BEN

A comparison between Black Ben and Gano as grown in the Station orchard does not seem to warrant the attitude of some writers in regarding them as synonymous. There is a distinct difference in coloring. A typical Gano is marked with rather broad stripes or bands of dark carmine under the crimson or light carmine shading. Black Ben when highly colored is a uniform deep carmine, and even on poorly colored fruit the coloring is a blush with no suggestion of striping.

Prof. N. E. Hansen[1] gives the origin of Black Ben as Arkansas, on the farm of the Rev. M. Black, near Lincoln, Washington County.

[1] *American Horticultural Manual*, Part 2, p 50.

The tree has the same habits of growth and fruit bearing as Ben Davis. The only point of difference in the trees is the purplish color of the older bark of Black Ben as compared with the yellowish bark of Ben Davis.

The fruit is essentially the same, except in coloring. Some persons find a better quality in the Black Ben, and as a cooking apple it has given more satisfactory results.

As a commercial variety, it can hardly be said to excel the Ben Davis, except in latitudes where the latter does not color well. The deep carmine is inclined to become dull and lifeless after the fruit reaches maturity, while the Ben Davis seems to improve in appearance when the greenish undercolor becomes yellow, brightening the contrasting crimson streaks.

With the development of new varieties, the use of cold storage for the earlier winter varieties and the increasing discrimination by the consumer against apples of the Ben Davis class, the planting of varieties of higher quality is much to be preferred. This is particularly applicable to northern Ohio.

BLENHEIM

Blenheim originated at Woodstock, Oxfordshire, England. It first appeared in the London nurseries about 1818. It has long been known in some of the eastern states and Canada, but has found no recognition as a commercial variety.

The tree is an exceptionally strong grower, healthy, and nearly free from blight, and is one of the largest among a number of others of the same age. It is rather late in coming into bearing; the oldest tree in the Station orchard (probably 18 years old) has borne only two full crops. Younger trees have begun bearing at 9 and 10 years from planting.

The fruit is very large; form oblate to roundish; color dull orange-yellow, blushed and faintly streaked with dull crimson; flesh yellow, somewhat coarse and granular, crisp, rather juicy; flavor rather sharp subacid, aromatic, somewhat resembling that of a Roxbury Russet; quality fair to good. The period of bloom is May 5 to 10, and the fruit ripens on the tree in the second and third weeks of September, and may be kept in cellar storage until early winter. It is much inclined to shrivel if the cellar is too dry.

Further trial is necessary to determine the value of this variety under Ohio conditions.

BOIKEN

This is an apple of Russian origin, widely planted in Germany and eastern France. It is one of the varieties imported by Prof. J. L. Budd for trial in Iowa.[1]

The tree is a vigorous grower, with main branches divergent to spreading and a rather bushy top. Branches are long, straight, rather slender, but bearing the heavy crops well. Older bark is smooth, yellowish. Twigs are rather stout, brown; leaves large to very large, of heavy texture, dark green. The tree is somewhat susceptible to twig blight, but otherwise resistant to disease.

The trees come into bearing at a rather early age, and produce heavy crops at 10 years from planting. An exceptionally heavy crop of 24.4 bushels was produced in 1914, by a tree in its fourteenth year. Thinning is especially necessary with this variety.

The fruit is large, broadly conical, with a wide flattened base, somewhat irregular; skin thin and rather tough, smooth; color clear lemon-yellow, blushed and faintly streaked with bright orange-red, almost scarlet; flesh nearly white, with yellow veinings, firm, crisp, somewhat coarse, moderately juicy; flavor acid; quality fair to good; season early winter; period of bloom May 5 to 12.

This variety was affected by the Bordeaux spray, which caused the early dropping of the fruit in the same manner as in the case of Banana previously mentioned.

Since lime-sulphur has been used as a summer fungicide, these apples hang on the trees until the second week of October, and reach maturity in November or December in cellar storage, maintaining a fairly good quality until midwinter.

Boiken as a dessert apple is pleasing only to persons relishing the brisk acidity. As a culinary fruit it is highly satisfactory, requiring less time for cooking than most other varieties, retaining the acid flavor and good quality. It is exceptionally good after maturity for all culinary purposes, and it is said to make very light-colored evaporated stock.

Boiken is better adapted to cold storage than most other yellow apples of the same season. It is free from scald, and if carefully handled the loss from decay is very small.

BOSKOOP

This variety originated in Germany. It has been planted to a limited extent in the state of New York. As grown in the Station orchard as a top-graft on Golden Russet, it makes a vigorous growth with large leaves. So far it has borne light to medium

[1]Iowa Agr. Exp. Sta. Bul. 19.

crops. The apples are very large, oblate, irregular and often ill-shaped. Skin is thick, harsh and dry, sometimes considerably russeted; color yellow, shaded with pink to crimson; flesh firm, rather coarse, juicy, somewhat granular; flavor briskly acid, becoming milder with maturity; quality fair to good; season early October to December.

The season of Boskoop places it in competition with a number of varieties of much better quality, which gives it but little promise of usefulness for Ohio apple growers.

BOUGH

This sweet apple, better known as Sweet Bough, is a very tender-fleshed summer apple of good quality.

As growing in the Station orchard, the trees are of moderate growth, somewhat bushy, but requiring only a limited amount of pruning. They are slightly susceptible to twig blight, and the fruit decays very quickly when injured. The variety is desirable as a sweet summer apple for home use, ripening early in August.

CAROLINA BEAUTY

This is a very dark red apple of North Carolina origin.

The one tree growing in the Station orchard is moderately vigorous, and of somewhat open growth. It bore a rather light crop at 6 years from planting, and produced its first heavy crop in 1914 (ninth year). The crop required much thinning, and the remaining apples were exceptionally free from blemishes.

The fruit is medium to large, roundish-conic, with a broad base; skin thin, tough, smooth; color dark crimson to deep carmine or wine color. The coloring is dull, and almost too dark to be attractive. Flesh is yellowish, tinged with red under the skin, firm, crisp, moderately juicy, somewhat coarse and granular; flavor mild subacid, with a rather peculiar, slightly musky aroma; quality fair; season late winter.

Further trial and observation will be necessary to determine its desirability as a winter apple in Ohio.

CELESTIA

This Ohio variety was originated by L. S. Mote, Miami County, from seed of the Stillwater Sweet. Its general appearance suggests relationship to Yellow Bellflower.

The tree is of moderate growth, very upright, bushy and compact, requiring considerable pruning. It is somewhat susceptible to twig blight.

Fruit is medium to large, oblate-conical, angular or ribbed; stem short; cavity wide; basin small, furrowed; skin thin, smooth, pale yellow, sometimes with a brownish blush; flesh yellowish, firm, crisp, juicy; flavor pleasing subacid; quality very good; season late fall and early winter; period of bloom May 5 to 9; fruit ready for picking the second week of October.

The tree has produced alternate medium and very light crops, and bore the first medium crop at 19 years from planting. Tardiness in bearing, together with the tenderness of the fruit, makes this variety desirable only for the amateur's collection. As a culinary apple it is very good for pie, and when just mature, which stage is attained in late October, not long after picking, is an excellent dessert apple. It has proved to be well adapted to cold storage, where its season is lengthened to midwinter.

CHARLAMOFF

In an attempt to gather a collection of hardy varieties of apples adapted to the severe droughts and cold winters of Iowa, Prof. J. L. Budd imported a number of varieties from Russia for trial at the Iowa State College, among which were Hibernal, Borovinka, Boiken, Longfield and Charlamoff. These varieties, with the exception of Borovinka, are represented in the Station orchard.

Charlamoff has been widely tested in the states west of Lake Michigan, and found exceptionally hardy. In the list of fruits adopted by the Minnesota State Horticultural Society in 1902, it is mentioned as one of four varieties having the first degree of hardiness.[1]

The tree is a rapid grower when young, with main branches upright and laterals spreading and very irregular. The older tree is bushy and rather vigorous, but not nearly as large as adjacent trees of Stark and Early Harvest. The branches are stout, nearly smooth, with bark olive brown, shedding in small flakes; twigs stout; leaves large, numerous, dark green. A susceptibility to twig blight is the only serious weakness so far appearing in the tree, a weakness which becomes a scourge among the young and rapidly growing trees of this variety.

Charlamoff begins to bear at an early age. One tree produced one-fifth of a bushel of excellent large apples as a first crop in the fifth season from planting. The older tree has borne alternate medium and light annual crops. It is not as productive as near-by trees of Oldenburg of the same age. Thinning is necessary to obtain apples of good size in the heavier crops.

[1]Minn. Agr. Exp. Sta Bul 83, p 5

Fruit is medium to large; form broadly conical, ribbed; stem medium to long, stout; cavity deep, acute, irregular or slightly furrowed; calyx large, green, closed; basin narrow, abrupt, much furrowed; skin rather thin and tender, with light lilac bloom; color creamy white, streaked with light pink to bright crimson; core rather large, closed or nearly so; flesh snowy white, sometimes tinged with pink under the streaks of color, firm, slightly spongy unless fully mature, tender, juicy; flavor a vinous sprightly subacid, with a peculiar spicy aroma; quality good; season rather short, the fruit ripening the second week in August, and inclined to drop quickly if not picked; period of bloom May 4 to 8.

Charlamoff has been suggested as a variety to extend the season of Oldenburg, but this seems unwarranted, as the latter has the longer season, and, if successive pickings are made, will furnish apples after the Charlamoff have dropped from the tree. As a dessert fruit, Charlamoff is milder and more aromatic than Oldenburg, but inferior to that variety for culinary uses. It is not adapted to storage of any kind, as it loses flavor very rapidly after ripening. Since Oldenburg has a longer season, is a better commercial apple, with heavier yields of fruit and a tree equally hardy, it apparently leaves no place for Charlamoff.

CHENANGO

This variety has been cultivated for more than 60 years, but has gained little recognition among the many varieties of its season.

The tree is a vigorous upright grower, rather bushy, and with large leaves. It is seriously susceptible to twig blight.

When well grown, the apples are medium to large, oval or oblong, beautifully colored with pink, and with bright crimson streaks and splashes. Flesh is white, very tender, juicy, mild subacid, aromatic, very good for dessert. This apple ripens during the latter half of August, with a long season, requiring several pickings for best results. Rather heavy and light crops are produced annually.

Chenango is probably most valuable for the home orchard or for local markets. It is too tender for shipping. As an exhibition fruit it attracts much attention on account of its bright coloring.

COLLINS

The original tree of Collins came up about 50 years ago on the Merriman farm near Fayetteville, Arkansas. Its desirable qualities were first noted by a nurseryman, George Collins, who became the originator of the variety now bearing his name.[1]

[1]Ark. Agr Exp Sta Bul. 49, p. 10.

It has been planted in Ohio to a limited extent. As growing in the Station orchard, it has proved to be exceptionally productive.

The tree is of vigorous healthy growth, with main branches upright or divergent, and laterals spreading, while the slender twigs are often drooping. The tree bears some resemblance to that of Ben Davis. It is inclined to grow very dense, with interlacing branches and twigs, and requires considerable pruning. The tendency to make numerous watersprouts does not permit as much pruning as often seems necessary. Late spring pruning, near the end of the period of active growth, seems not to induce sprouts which often appear after heavy pruning of dormant trees.

The fruit is medium sized, oblate, smooth, brightly colored with pink and crimson; flesh nearly white, very firm, somewhat coarse, juicy, rather rich subacid; quality fair; season late winter and spring; period of bloom in the Station orchard May 4 to 6; picking season the first week in November. The apples are very hard when picked and bear handling well. This variety is a long keeper in cellar storage, and, if placed in cold storage as soon as picked, it does not mature until the following summer.

As a dessert apple, it is when mature somewhat better than Ben Davis. For culinary uses it is good for pie, and makes an attractive baked apple of fair flavor.

As a southern commercial variety Collins may supersede Ben Davis, being of better quality. However, it does not begin to bear as early and requires more thinning to insure good size. Alternate heavy and medium crops are produced annually.

A general rating of the variety, with regard to Ohio conditions, would place it little, if any, above Ben Davis as a commercial apple. It is smaller than Ben Davis, but when grown in northern Ohio attains a more attractive color.

COX ORANGE

This is an English dessert apple of good quality, in season from late September to early winter.

The trees growing in the Station orchard are very dense, upright in form, with slender twigs and branches, making a shapely, round top with careful pruning. These trees, planted in 1905, produced the first blossoms and a few apples in 1914.

The fruit is of medium size, roundish, with an attractive coloring of crimson and carmine over yellow ground; flesh yellow, rather firm, juicy, rich subacid and aromatic; fruit inclined to shrivel when overmature.

The variety is perhaps most desirable for the home orchard, with a season limited to the time between the last Wealthy and first Grimes, a portion of the season otherwise not well supplied with good varieties.

DELICIOUS

No variety of apple introduced in recent years, and probably no variety ever disseminated, has aroused the interest of fruit growers to an extent so widespread and inclusive as that manifested in the Delicious. Basing the statement on the general rating of the variety as compared with other apples of the same season, perhaps no other variety has warranted the extensive advertising campaign carried on by the introducers in bringing the Delicious to public notice. A careful student of apples would doubtless make a few notable exceptions of varieties which he would be unwilling to exchange for Delicious. Among these one would find Grimes, Stayman, Red Canada, Northern Spy, Rhode Island and Wealthy, some of which far surpass the Delicious as a culinary apple, while the first three mentioned extend their period of usefulness for all purposes 1 to 3 months longer in cellar storage.

In the Station orchard there are 24 trees of Delicious which have produced fruit. Of these, two were planted in 1899, two in 1904, and twenty trees of Ben Davis planted in 1900 were topworked to Delicious in 1905. More than 100 younger trees of this variety are growing in other parts of the orchard and in the nursery. There are few trees of Delicious elsewhere in the State which have reached the age of fruit bearing, though many thousands have been planted.

Wm. B. Taylor in the article, "Promising New Fruits," in the Yearbook of the U. S. Department of Agriculture for 1907, gives the history of Delicious as follows: "This variety first came to notice in the orchard of the late Jesse Hiatt, of Peru, Madison County, Iowa, about 1881. It was then a sprout, supposed to be about 6 years old, from the stock of a Yellow Bellflower tree, the top of which had been destroyed. The beauty and fine quality of the fruit attracted Mr. Hiatt's attention, and he at once began its propagation in a small way for his own planting. The tree proved to be a hardy, vigorous, upright grower, with very heavy, dark-green foliage, and a regular annual bearer. At 15 years of age the original sprout was reported to be 13 inches in diameter at the ground. The originator stated in 1896 that while three-fifths of his orchard had been destroyed by drought and cold during the preceding 8 years, 'Delicious'

had not been injured in any respect. * * * * It was commercially introduced (by Stark Brothers Nurseries and Orchards Company) in 1895 under the name of 'Delicious,' which word was registered in the United States Patent Office as a trade-mark July 4, 1905."

Several prominent characteristics of this variety indicate a possible relationship to the Winesap group of apples. It resembles Winesap in the color of the older bark, the form and color of the leaves, its resistance to blight and susceptibility to apple scab on both leaves and fruit. The fruit also bears some resemblance to Winesap in form, and more in color, especially in the peculiarly mottled effect on some specimens, as well as in the shades of red represented.

The tree is of vigorous, divergent growth, inclined to be bushy, and makes a shapely, round top. Pruning becomes difficult with this variety in that the branches space themselves naturally and seldom interfere, and yet are so close together that pruning must be done, increasing the difficulty of deciding which branch should be removed. The branches are long, rather slender, straight and flexible, bearing heavy crops with ease. Older bark is rather dark brownish-gray, roughened only by the numerous small lenticels; twigs rather stout, maroon in color; leaves medium to small, of heavy texture, narrow oval or ovate, somewhat glossy, dark green.

Delicious is one of the varieties most resistant to blight in the Station orchard. The 20 top-worked trees mentioned above, adjoin a row of Jonathans, which are often seriously attacked by blight, while but few blighted twigs appear on the Delicious. On the other hand, its susceptibility to apple scab seems so great, that, if no means were available to overcome this disease, the variety would be almost worthless in sections where apple scab is common. Under the present system of spraying, the disease is practically controlled.

Delicious is being used by the introducers as a stock for top-working to varieties of weaker growth, or with a susceptibility to certain diseases. To such use it should prove to be well adapted.

The resistance to extremes of low temperature has been tested only once, during the winter of 1911-12. When the blossoms opened in the spring, they seemed very poorly developed, with short, distorted, almost colorless petals, resulting in a light setting of fruit.

Delicious has produced fruit on trees in the Station orchard the sixth year from planting, gradually increasing the yields until alternate heavy and rather light crops are produced annually.

Twenty trees fruiting in 1914 produced 165 bushels, or an average of 8¼ bushels per tree. The top-grafted trees are as large as those planted as root-grafted nursery trees.

The apples are not inclined to hang in clusters, and their distribution throughout the tree is somewhat deceptive when thinning time arrives, so that one is likely to err on the side of insufficient thinning.

The fruit is medium to large, and sometimes very large; form variable, oblong-conic, usually oblique, unsymmetrical and strongly ribbed, especially toward the apex; stem medium to long, stout, with a peculiar enlargement at the insertion; cavity wide, rather deep, smooth; calyx medium to small, closed or partly open; basin moderately wide, deep, abrupt, furrowed, surrounded by five prominent protuberances, which are characteristic of the variety; skin thick, rather tough, very smooth and usually very glossy, with a light bluish bloom; ground color lemon yellow, shaded and mottled with dull pink shading to deep crimson, indistinctly streaked with the darker color. The prevailing color effect is in shades of red. Flesh is yellowish, firm until mature, fine-grained, very juicy, becoming mealy from the core outward at maturity. In the crop of 1915, grown during a very wet season, many specimens were found to be water-cored. Flavor is very mild subacid to nearly sweet, with a rich aroma which is almost a perfume; quality excellent. The fruit reaches maturity in cellar storage in December or January. The period of bloom in the Station orchard is May 4 to 10, and the fruit is ready for picking about the second week in October.

Delicious in cellar storage is an early winter apple, and becomes mealy and rather dry soon after maturity. The rich flavor also decreases rapidly at this time, and the apples are often of very poor flavor in a month after maturity.

The variety is well adapted to cold storage, and its period of usefulness is lengthened well into the spring season. It is not inclined to shrivel in either cellar or cold storage. Handling in bulk or packing in barrels is undesirable for Delicious because of the irregularities of form and the long stem, which often cause serious injuries.

Delicious as a dessert fruit depends entirely upon personal tastes; the majority of persons find it an exceedingly pleasant dessert apple; others are quickly satiated by its perfumed richness, while a large portion of the minority much prefer an apple of distinct acidity. As a mildly acid fruit for invalids, and others with whom acid fruits do not agree, Delicious has been found highly desirable.

For culinary uses the most satisfactory method of preparation is by baking, in which the flavor seems to be retained to a greater degree than in sauce or pie. The lack of acidity makes it undesirable for the last-named uses, the flavor being flat and characterless.

As a variety for the commercial orchard Delicious is quite promising. Health and vigor of the tree, the production of fruit at an early age, the attractive coloring, a distinctive form readily recognized by the dealer and consumer, which prevents misrepresentation, and an excellent dessert quality are characters extremely favorable to the development of a permanent trade. To the foregoing should be added the adaptation of the variety to cold storage, and to the box and carton of bushel or less capacity as a container, making a combination which very few other varieties can even approximate.

Furthermore, Ohio growers in at least the southern two-thirds of the State, if not throughout the entire State, can be assured that they can produce Delicious apples better in color and flavor than those produced by any of the apple-growing districts of the far West or Northwest. Competition in point of size is in favor of the western growers. However, the Delicious apples from the Station orchard, which were packed in bushel boxes from the crop of 1914, graded into two sizes, of 96 and 125 per box. Of these, the average consumer prefers the smaller size as a dessert fruit. A trial shipment of these boxes to a Cleveland commission house dealing in fruits brought a price equal to that received for western apples.

Another point of importance to growers who are inclined to be conservative is brought out by the inquiry made of the authors on several occasions, "Do you not think the planting of Delicious will be overdone?" At least one case of "overdoing" has come to our notice: A man was reported to have planted 100 acres exclusively to Delicious. In case he successfully brings his orchard to bear its first heavy crop, he will realize that picking the fruit from 100 acres of apple trees, of a variety having a rather short ripening period, is a prodigious undertaking.

A conservative statement regarding the future of the Delicious apple would assign a place for it in every home orchard and in every commercial orchard in the districts to which it is adapted, but not to the displacement of any of the dozen or more varieties of equal or better quality, and of a wider field of usefulness.

DUDLEY

This seedling of Oldenburg originated with J. W. Dudley, of Aroostook County, Maine, and is extensively grown in northern

New England.[1] The variety bears many points of resemblance to Oldenburg. The tree is of spreading, moderately vigorous growth, with stout, crooked branches, stout twigs and large, heavy-textured, dark-green leaves.

The tree in the Station orchard produced an unusually heavy crop of fruit in 1910, but has since borne only light crops of very large apples.

The fruit is large, roundish-oblate; skin smooth, pale yellow washed and streaked with pink; flesh greenish white, crisp, juicy; flavor rather sharp acid until mature, when it becomes milder; quality fair to good. This variety ripens over rather a long period, from the middle of August to early September.

It is inferior for home use to Lowell, Jefferis and Maiden Blush of the same season, and is too tender for shipping.

DULING

The origin of this variety is uncertain, as well as the authority for the name. The one tree growing under this name in the Station orchard has attracted unusual attention on account of its annual crops of beautifully colored fruit. The variety has not come to notice elsewhere in the State.

The most serious weakness of this variety is a susceptibility to blight. Another weakness of less importance is a susceptibility to apple scab on leaves and fruit.

The tree has been one of the most regular producers of fruit in the orchard. Alternate heavy and medium crops have been produced annually. Because of the medium-sized tree and rather small fruit the production in bushels falls below that of other annual bearers of the same season. The average crop for the last 5 years has been a little less than 10 bushels annually. The fruit has been thinned regularly for the last 3 years, and a marked increase in size and uniformity has been observed.

The fruit is small to medium in heavy crops; form oblate-conic, somewhat irregular; stem rather long and stout; cavity wide and deep; calyx large, green; basin rather wide, deep, abrupt, furrowed; skin rather thick and tough, very smooth and glossy after the heavy bloom has been rubbed off; color deep crimson with indistinct stripes of carmine, nearly or completely covering the greenish-yellow ground color; flesh nearly white, fine-grained, tender, becoming mealy with maturity; flavor mild subacid, aromatic, somewhat resembling that of Fameuse; quality good to very good; ripening season the last week of August; period of bloom rather long, May 2 to 10.

[1] *Apples of New York*, II, 48

If the fruit is placed in cold storage immediately after picking, it will keep its fine appearance until the end of the year, but it develops a rather poor flavor, and is not promising as a storage variety.

As a dessert fruit of high quality and beautiful coloring, Duling has few equals. As a culinary apple it makes good sauce and pies, but the mild flavoring gives an indifferent quality to the cooked fruit.

Duling would be useful in the home orchard on account of its annual bearing, fine dessert quality and attractive color.

EARLY HARVEST

Early Harvest is a well-known variety supposed to have originated in America, and known in cultivation for more than a hundred years. It has long been a favorite for the home orchard, though other varieties of the same season and of better quality are now in cultivation.

The tree bears moderate crops annually. The fruit is very good in quality if taken at the proper stage of ripening. It is in season during the third week of July. The period of bloom in the Station orchard extends from May 2 to 6. The tree is susceptible to blight and crown gall, and the fruit is often attacked by scab.

ENSEE

A chance seedling sprang up about 1880 near a place where cider had been made in earlier years on the farm of the late Nelson Cox, in Windsor Township, Lawrence County, Ohio. Little notice was taken of it for several years after it began bearing until 1895, when its crop attracted attention. Since then it has been disseminated in an experimental way, and commercially to a slight extent, by the sons of Mr. Cox.

The coined name, "Ensee," was applied to the variety about 1898 in perpetuation of the apple brand (N. C.) of the originator, who was for many years recognized as one of the leading commercial apple growers of his region.[1]

Ensee bears sufficient resemblance to Rome Beauty to warrant the opinion that it is a seedling of this well-known variety. This resemblance is most marked in the upright habit of growth, slender twigs, yellowish bark, the inclination to set fruit from terminal buds and the rather late period of bloom.

The adaptation of Ensee to southern Ohio has been established by its continued success in the orchards of Lawrence County, and

[1]Wm A Taylor, *Promising New Fruits*, Yearbook, U S Department of Agriculture (1907), p 307.

several more years' test in the Station orchard and elsewhere may find a place for it wherever Rome Beauty succeeds.

The tree is of moderate growth, main branches being upright, with slender laterals and twigs. Bark is yellowish brown, smooth, twigs are long, slender, often much interlaced by being drawn down by the fruit; leaves of medium size and heavy texture.

Ensee as growing in the Station orchard is more susceptible to blight than Rome Beauty. Crown gall has appeared on one of the trees.

The bearing habits have not become established with the trees in the Station orchard. They were ordinary nursery trees of unknown variety, planted in 1900, top-worked to Ensee in 1904 and produced the first fruit in 1909. Two of the trees bore moderately heavy crops in 1914. The crop of 1915 was confined to a few trees of the row, but the grade of fruit was exceptionally good. Fruit is often produced in clusters on terminal buds, especially in the early crops. If the trees are headed back regularly, which is almost imperative if the extreme upright growth is to be corrected, the first fruit buds are often cut away. Low heading is much to be preferred with this variety, so that the terminal buds may be allowed to set fruit earlier in the life of the tree. Thinning is necessary to prevent loss of fruit from the clusters by crowding, to which they are more inclined because of the large size of the apples and the relatively short stem.

The fruit is large in size; form roundish-oblate, unsymmetrical; stem medium in length, rather slender to stout; cavity wide, deep, smooth or slightly russeted; calyx small, closed; basin rather narrow, deep, abrupt, furrowed, with the red coloring of the skin extending into the basin; skin rather thin, tough, smooth, somewhat glossy; color yellow, washed and mottled with a bright crimson which is almost scarlet, obscurely streaked with carmine; prevailing color effect a bright orange-red, usually modified by a grayish scarf-skin over the base of the apple. Seeds are rather numerous; core is large, partly open. Flesh is yellow, firm, somewhat coarse, granular, moderately juicy; flavor rich subacid, with a pleasing aroma; quality very good.

The period of bloom in the Station orchard is May 4 to 9. The fruit is ready for picking the second week of October. In cellar storage the apples mature in January and retain good quality until March. The tendency to become mealy and dry after maturity, so marked in Rome Beauty, is not noticeable in this variety.

As a culinary apple Ensee requires a longer time for cooking than most other apples. Even then the pieces remain whole when

stewed or baked in pie. The baked apple is spongy, with the juice draining to the bottom of the pan. The fruit is rich yellow and of good flavor when cooked.

The following points regarding Ensee were mentioned by U. T. Cox, of Proctorville, Ohio: Occasional specimens of fruit appear on trees of Ensee at 2 years from planting, but paying crops are not expected before the sixth or eighth year, in this respect the same as Rome Beauty. The tree continues to grow upright only until fruit bearing begins, after which it spreads more and does not grow so rapidly. Heading at 18 to 24 inches from the ground is preferable for Ensee, and the tops are cut back if they become too tall before fruit bearing begins. The apples are as large and the crops as heavy as those of Rome Beauty, hanging longer on the trees. They keep as well in either cellar or cold storage, but scald more if picked too early. They remain crisp and juicy later in the season and are of better quality than Rome Beauty.

FALLAWATER

One of the most familiar synonyms of this variety is Tulpehocken, which is used almost as much as the approved name. It is an old, well-known variety, having originated in Bucks County, Pennsylvania. The vigorous growth, fruitfulness, large size and mild flavor find for it a place in almost every home orchard.

The trees in the Station orchard are larger in size than any of the trees of other varieties planted at the same time. The biennial crops are very heavy and exceeded 30 bushels per tree in 1913. The fruit is usually very large, but not well colored.

In season with Fallawater are Banana, Grimes, Hubbardston and Sutton, which surpass it in both quality and length of period of usefulness.

FALL JENETTING

This is an old variety of Connecticut origin. It is not common in Ohio; and, when compared with other varieties of its season, there seems to be no reason for more extensive planting, though it may have special adaptations which might make it desirable in some localities.

The tree is exceedingly vigorous, and grows rapidly in good soil. It begins to bear at a rather early age and produces heavy crops at 12 to 14 years. The fruit begins to fall before maturity; in fact, it does not develop the normal color on the tree. The apples show a decided pink coloring after exposure to sunlight for several days.

Being in season with Wealthy, Fall Jenetting apparently has no place, unless a tree of larger and thriftier growth is desired.

FAMEUSE

Fameuse represents one of the largest groups of varieties among the apples grown in the United States and Canada. Prof. F. A. Waugh,[1] in "Apples of the Fameuse Type," summarizes the history of this variety as follows: "Fameuse has had a long and interesting history, most of which, however, is now less a matter of record than of conjecture. It probably originated in the French settlements on the St. Lawrence from seed brought from France between 1600 and 1650. It was distributed widely, though chiefly by seeds. It was first planted in Vermont at Chimney Point on Lake Champlain about 1700."

Under the subject, "Variations," the same author writes: "One of the striking things about this type is its strong tendency to reproduce itself from seed. This has been taken advantage of even within the last fifty years, and 'Fameuse' apples have been grown from seed by the hundred and planted into orchards. This practice prevailed largely in Quebec, in neighborhoods where nurseries were scarce and grafted nursery trees expensive or unknown.

"We may conclude, therefore, that the modern Fameuse apples are most certainly not all from the same original stock. The conspicuous variations among them are thus to be accounted for, at least in part."

This propagation from seed accounts also for the large number of related varieties, among which possibly many hundreds were never propagated beyond the orchard or garden in which they originated. Among the varieties now grown, McIntosh, Shiawassee, Louise, Canada Baldwin and Fameuse Sucre are represented in the Station orchard.

Fameuse, or Snow, by which name it is equally well known, is grown throughout Ohio; but, an account of its susceptibility to scab, its lack of keeping qualities and its small size in comparison with other varieties of its season, it has not found a prominent place in the orchards of the State.

The tree is of moderate growth, with rather stout, divergent branches, the lower laterals being often somewhat drooping. The bark is brownish gray. Twigs are rather slender, dark maroon in color; leaves medium to small, rather light textured. A slight susceptibility to blight has been noted; otherwise the tree is healthy. The scab has so far been controlled by spraying as practiced in the Station orchard.

[1]Vermont Agr. Exp. Sta. Bul. 83.

Fameuse begins to produce fruit at 5 or 6 years from planting, but light crops are the rule until the tenth or twelfth year. It is usually a biennial bearer.

The fruit is small to medium; form conical, varying to roundish or oblate, sometimes obscurely ribbed, often unsymmetrical; skin rather thin and tender, often roughened by russet dots and lines, yellowish green, nearly covered with crimson, and obscurely streaked with deep carmine—general color effect red, indistinctly striped; flesh snowy white, firm at first, juicy, becoming somewhat spongy and dry when overmature; flavor mild, vinous subacid, with a peculiar but pleasing aroma; quality very good for dessert. The fruit ripens on the tree about the first of October. The period of bloom in the Station orchard is May 5 to 9.

Ohio is perhaps too far south of the region of natural adaptation for the Fameuse, which reaches its best development in the St. Lawrence Valley. Where Grimes and Wealthy succeed in Ohio, it would seem undesirable to plant the Fameuse.

FAMILY

This old variety of Georgia origin was mentioned by Dr. John A. Warder as early as 1867.[1]

The trees growing in the Station orchard are of a moderate, divergent habit of growth, having so far produced but three good crops of fruit, the tenth, twelfth and fourteenth years from planting. They seemed to suffer considerable injury from the low temperatures of the winter of 1911-12.

This is an attractive red and yellow apple; flesh white, fine-grained, juicy; flavor rich subacid, with pleasant aroma; quality very good. This apple is one of the best of its season, ripening the second week of August. The period of bloom is May 3 to 9.

While Family is a very good apple for both dessert and culinary uses, and of a little later and longer season than Oldenburg, yet it is not nearly so productive, nor as early in coming into bearing.

FANNY

This variety is similar to Family in color and flavor of the fruit. It originated in Pennsylvania. The trees growing in the Station orchard have been rather unproductive.

The fruit is of unusually attractive color and good size; and, if productiveness can be secured under different conditions, it would be a valuable addition to the list of summer apples for Ohio.

Fruit is medium to large, oblate; color yellow, almost covered with dull pink shading to deep crimson; flesh greenish white, rather

[1] *American Pomology*, p. 515.

firm, fine-grained, juicy; flavor rich subacid with pleasing aroma; quality very good for both dessert and culinary uses; period of bloom May 5 to 9; picking season the second and third weeks of August.

FLORY

This highly attractive yellow apple, exceedingly uniform in its characteristics, is an Ohio variety, having originated in Montgomery County. It is usually rather tardy in coming into bearing, and is moderately productive.

It is represented in the Station orchard as a top-graft on Walbridge. The growth is upright, with long branches rather thickly set with small lateral branches and twigs. The graft was set in 1905 and has produced crops varying from a dozen apples to more than 3 bushels during the last 4 years. It is now about the size of an average 6-year-old tree.

The fruit is medium to large, with a very regular, roundish-oval form; skin a clear golden-yellow, with a peculiarly uneven "pimpled" surface, caused largely by the raised russet dots; flesh creamy yellow, tender, crisp, juicy, a little coarse-grained; flavor rather sharp subacid; quality very good for sauce and pie. The period of bloom is May 4 to 9, and the fruit ripens the latter part of September.

GANO

The Gano is one of the varieties most closely related to Ben Davis. The few points, aside from coloring, in which they differ are of little importance from a practical standpoint. The chief difference in the tree is that the older bark is more of a purplish brown than that of Ben Davis. The early age at which crops are produced, the annual bearing habit, productiveness, and keeping qualities in cellar and cold storage, as well as flavor and quality, are practically the same in both varieties. In coloring, the difference is mainly in the undercolor, which is dull pink to crimson as compared with greenish yellow to pink in Ben Davis. The rather broad streaks and bands of deep carmine in Gano seem to deepen the shade of red in the undercolor, giving a general effect of dark red.

In the coloring, the same fault appears as noted in the description of Black Ben—that of a faded or dull appearance after the apples reach maturity.

For planting where an apple of this class is desired, Gano is to be preferred above Ben Davis only on the basis of higher color.

GARDEN ROYAL

One of the few dessert varieties of apples which can be classed as "excellent" is the Garden Royal. It is an old variety of Massachusetts origin. The inclination toward large fruits of all kinds, among nurserymen, growers, dealers and consumers alike, has prevented this fine apple from being distributed as widely as its quality merits.

To quote from the description given in "Apples of New York,"[1] "Garden Royal is not a good variety for commercial planting because the fruit is too small and its season early and short, but by many it is considered one of the very best dessert apples of late summer and early autumn. The fruit is of regular form, very handsome, deep yellow, striped with orange-red and dark crimson. The flesh is very tender, aromatic, and with a delicate, pleasant acid flavor."

As grown in the Station orchard, Garden Royal has a rather long season for a summer apple, approximately the first two weeks of September.

The fruit is medium to small, nearly always attractively colored rich yellow, with shading and streaks of orange-red to crimson. The skin is sometimes slightly russeted, and the apples are inclined to shrivel after picking, especially in the warm dry weather often occuring at that season. The flavor is mild subacid, with rich aroma.

GIDEON

This is considered by the originator, Peter M. Gideon,[2] to be a seedling of a small crab apple probably crossed with pollen of Blue Pearmain, which it resembles in the tree, and somewhat in the form of the fruit. The tree is said to be very hardy.

As growing in the Station orchard, Gideon is of very upright, compact growth, with smooth yellowish bark, resembling Yellow Transparent more than any other variety in the orchard. The leaves are large and the branches are set with many fruit spurs, similar to those of a pear tree.

The fruit is large, roundish-conic, somewhat irregular; skin very smooth and glossy; flesh very hard, very juicy, coarse; flavor rather sharp acid; quality poor. The fruit is greatly inclined to water-core, and is often worthless.

The variety is recommended only as a hardy stock for top-working.

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[1]Vol. II, p. 72
[2]Am. Pom Soc. Report 1885, p. 26.

GIFFIN

The following account of the history of this variety was secured through the kindness of W. J. Giffin, residing near the Station: The original tree grew as a sprout from the roots of a tree, the top of which had been destroyed, in the orchard of Joseph Giffin, about 5 miles south of St. Clairsville, Belmont County, Ohio. The first fruit was produced about 1879. The variety came to the notice of an agent of the Albaugh Nursery Co., of Tadmore, Ohio, and scions were secured in 1885 for propagation under the name of Giffin's Beauty. Through some mistake the trees purchased by the Station in 1893 were received under the name of Bortz. Their identity was determined by the observation of Mr. Giffin, who noted that the fruit was of the same variety as that produced by the original tree in his father's orchard.

The tree is of moderate growth with branches rather stout, somewhat crooked, divergent, open. The tree is a slow grower after regular fruit production begins. Older bark is brownish gray. Twigs are medium to slender, light brown; leaves medium to small. A moderate susceptibility to blight seems to be the only weakness of the tree.

Regular crops have been produced, consisting of alternate heavy and medium or light yields annually. Thinning has been necessary with the heavy crops, and is probably responsible for an increase in the light or "off-year" crops. A total of 150.6 bushels has been produced by the two trees during the last 5-year period.

The fruit is medium to large, roundish-oblate, inclined to conical, usually quite regular; stem short to medium, rather slender; cavity wide and deep, russeted; calyx of medium size, open; basin wide and somewhat shallow; skin thick, moderately tough, very smooth and glossy when the heavy grayish bloom is rubbed off; color rich bright crimson, sometimes showing the greenish-yellow undercolor; flesh creamy yellow, rather firm, crisp, fine-grained, moderately juicy; flavor mild subacid, mild aroma; quality fair to good.

The period of bloom is May 2 to 10. The fruit is ready for picking the first week of October. In cellar storage maturity is reached in January, and the fruit remains in good condition until March. In cold storage its season is several months longer. A tendency to scald in storage is a serious weakness.

As a culinary apple it is fairly satisfactory, though the mild flavor persists in the cooked fruit. For dessert purposes it is not sufficiently rich in flavor to compete with Jonathan or Baldwin of the same season.

As a brilliantly colored winter apple of fair quality, Giffin may find a place in the orchards of Ohio, and might be recommended, for a limited trial at least, in the central part of the State.

GOLDEN RUSSET

The trees of this variety in the Station orchard have been very unsatisfactory in amount of fruit produced, and in an extreme susceptibility to blight. Only light crops have been produced, and the apples are very poor in keeping quality, extreme shriveling and decay rendering the fruit useless early in the winter.

The quality of Golden Russet is unusually good when just mature, if kept in a very moist cellar to prevent shriveling. The flavor is a rich aromatic subacid though the flesh is very firm and inclined to be tough.

There are so many good varieties of better keeping qualities for midwinter that this Russet should be discarded.

GRAVENSTEIN

This variety, imported from Europe nearly a century ago to the vicinity of Albany, New York, is said to have originated in Germany in the eighteenth century. It has been pretty generally disseminated in New York state, but in most localities it is grown to a limited extent only.[1]

The tree is of vigorous growth, nearly free from disease as observed in this locality, but is rather unproductive; in fact, it is unprofitable for this reason.

Fruit is medium to large; form roundish-oblate, irregular, variable; color golden yellow with streaks of light and dark crimson; flesh creamy white, crisp, juicy, becoming rather dry and granular after maturity; flavor brisk subacid, very aromatic; quality very good, highly esteemed for culinary uses. Fruit ripens during the last of August and first two weeks of September. Period of bloom extends from May 4 to 9.

GREENVILLE

Greenville is a very attractive, smooth, firm-fleshed apple, with clear, bright coloring. It was originated from seed of Maiden Blush in 1874, by Jason Downing, of Darke County, Ohio. It was introduced by E. M. Buechly, Greenville, Ohio, as Downing's Winter Maiden Blush, but the name afterward was changed to Greenville.[2]

The trees growing in the Station orchard are exceptionally vigorous, upright and compact in habit of growth. Annual light to

[1] *Apples of New York*, I, 85
[2] *Apples of New York*, I, 152

medium crops of fruit are produced. If fruit bearing cannot be increased under different conditions or by different methods, the Greenville must be considered as an unprofitable variety.

The fruit is medium to large; skin smooth, rather thick and tough, becoming oily in storage; color clear lemon-yellow, with more or less brownish-pink blush, closely resembling Maiden Blush. The period of bloom in the Station orchard is May 4 to 9. The fruit is ready for picking the second week in October.

Greenville reaches maturity in cellar storage in early to mid-winter, and, on account of an extreme tendency to scald, is often partly decayed before its best quality has developed.

Considering its merits and demerits in comparison with the many good varieties of the same season, Greenville cannot be recommended for general planting.

GRIMES

Perhaps no other variety now in general cultivation can so closely approximate the requirements of a perfect apple, when considered from the consumers' standpoint, as the Grimes. If we were limited to but one variety of winter apple for all uses, the place could be filled with Grimes to a greater degree of satisfaction among apple consumers than with any other variety. It combines the rich, aromatic, subacid flavor, relished by the great majority of persons, and an excellent culinary quality, with an attractive golden-yellow color and a long season of usefulness.

The extension of its season by the use of cold storage enables Grimes, with proper care in handling, to cover the period from the first ripe windfalls of late September to the first of May.

The original tree of Grimes grew in Brooke County, in the "Panhandle" of West Virginia. It is recorded[1] that fruit from this tree was sold to the New Orleans traders as early as 1804. The general dissemination of the variety extends from Virginia to Arkansas and north nearly to the Great Lakes. It also occupies a prominent place in the apple-growing districts of the West and Northwest. Since better methods of handling and packing have been developed, and cold storage made more generally available, Grimes has been gaining rapidly in favor with commercial growers in the sections to which it is adapted.

The tree is of moderately vigorous growth, somewhat bushy, with branches divergent, stout, usually bearing the heavy crops of fruit without breaking. Grimes requires considerable pruning because of its tendency to a bushy growth, and will endure heavy pruning perhaps better than most other varieties.

[1] *Apples of New York*, I, 154.

In the Station orchard the disease susceptibility of Grimes is limited practically to one trouble. This is the so-called "collar rot," which is so common on Grimes as to become almost synonymous with the name of the variety. It manifests itself in a partial or total decline of the tree and results in death often within the course of a single season.

As a result of investigations[1] made at the Pennsylvania State College by H. R. Fulton and J. F. Adams, following some work done by M. B. Waite, of the U. S. Department of Agriculture, the conclusion has been reached that the disease is due to the organism (*Bacillus amylovorus*) causing the various forms of blight in apple and pear trees. On this account it is suggested that the proper name for this trouble is "collar blight." Under conditions as found in the Station orchard, it cannot be said that collar rot has caused greater loss among the trees of Grimes than other diseases have caused in different varieties. Of the 40 trees of Grimes set in the Station orchard in 1900, three have been removed, evidently killed by collar rot, while four others are more or less affected.

These trees, as well as three older ones in the orchard, have been giving satisfactory yields of fruits. As a rule, alternate medium and heavy annual crops have been produced. The 37 trees now standing, of those set in 1900, have produced a total of 984 bushels during the last 6 years. Three trees set in 1893 produced during the same period 309 bushels, or a yearly average of 17.1 bushels per tree. This exceeds the average yield of three Baldwin trees of the same age. Thinning has been necessary with nearly every crop of Grimes included in the foregoing records.

The fruit is medium to somewhat small in the average heavy crop; form roundish or slightly oblong, nearly equally flattened at the base and apex, fairly symmetrical, sometimes ribbed; skin thin, rather tender, dry, and often roughened by numerous small russet dots; color greenish yellow, becoming rich golden-yellow when mature; flesh creamy yellow, rather firm, crisp, juicy; flavor rich aromatic subacid; quality excellent.

The period of bloom in the Station orchard is May 4 to 9. The picking season is rather short, as the apples mature more uniformly than most other varieties. The average of the dates recorded is October 3, with a total range from September 29 to October 7. A slight gain in size can be secured for the smaller apples by making two pickings.

[1]Prof C R Orton, *Some Orchard Diseases and Their Treatment*, Penn. 55 (1914) pp. 43-56, pl 5-9.

If Grimes apples can be placed in cold storage soon after picking, they will reach maturity in midwinter and keep in good condition until early spring. In the Station cellar storage, test samples of originally sound apples have been kept without developing decay until March 1. Grimes mature in the cellar in November or December. If the proper conditions of temperature and moisture can be maintained, the apples will remain in excellent condition and flavor for several months after maturity. If the cellar is too dry, they sometimes become badly shriveled. The maximum degree of quality for Grimes can be secured by storing in a well-ventilated cellar, where the temperature can be maintained at 36° to 40° F. Shriveling will be much reduced if the cellar has a moist earth floor.

Grimes, as well as many other varieties of apples, will absorb strong odors, such as from oils, turpentine, disinfectants, ammonia, decaying vegetables and the like, and precautions with respect to these substances are necessary.

Grimes is exceptionally well adapted to packing in boxes or cartons. Wrapping the individual with paper is almost imperative on account of the rather long stem, which often injures adjacent fruits when packed in bulk. A structural peculiarity of this variety adds to its value as a box apple. The transverse diameter and the superficial length of the axis are nearly the same, adapting the apples better to the various styles of packs, as well as to the mechanical grader.

HUBBARDSTON

This variety originated in Massachusetts and has long been known as one of the best varieties in cultivation in that State. Some confusion has arisen through the dissemination of this apple in some sections under the name of American Blush. It is posible that a strain of the variety has been developed which is a variation from the Hubbardston. The trees planted as American Blush in the Station orchard seem to have more vigorous growth and larger fruit than those of Hubbardston.

Hubbardston is of medium size, nearly round; skin rather thin and tender, smooth; color yellow, sometimes nearly covered with crimson, usually mottled and streaked; flesh tinged with yellow, rather firm, very fine-grained, tender, juicy; flavor mild subacid, aromatic; quality very good; season early winter.

The variety is most useful as a dessert apple for early winter. It is not well adapted to cold storage. It succeeds best in sections to which Baldwin is adapted. As grown in the Station orchard it ripens too early for a good early-winter apple.

HUNTSMAN

This is an apple of Missouri origin, in which region it has gained a prominent place in the commercial orchards. It is not well known in the eastern states and seems rather poorly adapted to Ohio conditions.

The tree in the Station orchard was planted in 1899, and, though it is a large, thrifty tree, it has borne but three crops of fruit.

Huntsman is a large, oblate, yellow apple, sometimes blushed; flesh firm, yellowish, rather coarse, juicy; flavor mild subacid, aromatic, pleasing; quality good, a little too mild for a good culinary apple; season midwinter, but the fruit will keep until spring.

Huntsman will require further trial to establish its desirability under Ohio conditions.

INGRAM

Ingram is a seedling of Ralls, having originated on the farm of Martin Ingram, east of Springfield, Mo., about 1850 or 1855. It was found to be an exceptionally firm, long-keeping apple, and later gained wide popularity, especially in Missouri and Arkansas; and it is now being largely planted in commercial orchards, especially in the former state, where one orchard of 240 acres is set solidly with it.[1]

Bearing many of the prominent characteristics of its parent, Ingram is probably adapted to an equally wide range of territory. In Ohio it is one of the very latest keepers of the apple season, being better in this respect than Ralls, which is inclined to become shriveled and "leathery" toward the end of the season.

The tree is vigorous, with upright-divergent habit of growth, which becomes more open and spreading with age and fruit bearing. Branches are long, straight; bark is brownish gray; twigs are rather slender, brown; leaves medium to small, somewhat glossy, dark green.

A serious weakness of the tree is a susceptibility to blight, especially in the blossoms, which sometimes suffer severely. However, this seldom progresses beyond the fruit spur, and cankers are not often found.

The habit of bearing heavy, biennial crops prevails with this variety as with Ralls, and thinning is desirable with every heavy crop, and is sometimes absolutely necessary to prevent the breaking of branches, and to gain salable size of the fruit. The heavy setting

[1] *Promising New Fruits*, Yearbook, U S. Department of Agriculture (1901), p 382.

of the fruit is directly related to the tendency to set full clusters of five to seven apples, which are but little affected by the "June drop."

The fruit is medium to small; form truncate conical; stem of medium length, stout; cavity wide, deep, smooth, usually with the coloring extending nearly to the stem; calyx rather large, partly open or closed; basin rather narrow, abrupt, also colored nearly to the calyx; skin rather thick and tough, smooth, with much gray-pink scarfskin; undercolor clear yellow, dotted, mottled and streaked with bright pink to crimson—general effect pink with broken stripes of darker color; flesh creamy white, very firm, crisp, and juicy, somewhat coarse; flavor mild subacid, pleasing aroma; quality very good—a refreshingly juicy dessert apple; season late winter and spring; period of bloom in the Station orchard May 6 to 13, or about the same as Ralls. The fruit is ready for picking the last week of October, and reaches maturity in cellar storage in March or April.

It is not inclined to shrivel except in a very dry cellar, usually remaining in good condition and flavor until late in the spring. It does not mature properly in cold storage, and has been kept for more than a year after picking. This does not mean that Ingram is not adapted to cold storage, but that the fruit should be partly matured before storing, or taken out for a period of ripening before attempting its use or sale.

As a dessert apple, Ingram is relished by those who prefer a firm, crisp, juicy, refreshing fruit. For culinary purposes the mild acidity makes the cooked fruit somewhat insipid.

Ingram excels in the following points: late blooming period, hardiness and vigor of the tree, productiveness, refreshing dessert quality, late keeping and attractive coloring. It can be safely recommended for all localities where Ralls has been successfully grown.

ISHAM

This is a firm-fleshed, red, sweet apple of Wisconsin origin, from seed of Bailey Sweet.

Fruit is large, round; skin thick, tough, dry and harsh, with an extensive scarfskin, which greatly modifies the rich dull-red coloring; ground color pale yellow, nearly covered with dull, dark crimson, mottled and indistinctly striped with deeper color; flesh creamy yellow, very firm, somewhat tough, moderately juicy; flavor sweet, with mild, pleasing aroma; quality good.

The fruit ripens on the tree in late September, and will keep in cellar storage until December, although it is much inclined to

shrivel in storage. It is a pleasing sweet apple for dessert use and good as a baked apple, but requires a long period of baking for best results.

In fruit production, this variety is rather promising. The tree in the Station orchard in its seventh year from planting produced 1.7 bushels of good-sized apples, and 2.4 bushels in the ninth year, indicating a biennial habit of bearing.

The apples ripen uniformly and the entire crop will fall from the tree within a few days if not harvested at the right time, and if warm weather prevails. The fruit is very hard at picking time and bears handling exceptionally well.

JEFFERIS

This is considered by some to be the finest dessert apple of its season. It has a delicious, aromatic, mild subacid flavor, and is very tender, juicy and refreshing.

The bearing habits of Jefferis are somewhat variable, but the average yield of fruit is satisfactory, considering the moderate-sized tree and its adaptation to the home orchard.

A tree, now 22 years from planting, produced an average yield of 7.4 bushels annually during a 6-year period, usually in alternate light and medium annual crops. A crop of excellent apples was produced in 1915, a total of 15.7 bushels, with only .2 bushel of second-grade fruit.

The fruit is small to medium in size in full crops; form broadly conical to oblate; skin thin and very tender; color pale greenish-yellow, striped and splashed with bright crimson—a very attractive coloring; flesh creamy yellow, crisp, very fine-grained, juicy; flavor rich aromatic subacid; quality excellent for dessert when mature. The fruit ripens over a long season in late August and early September. Period of bloom in the Station orchard is May 3 to 9.

JERSEY SWEET

The combination of a rich flavor with sugary sweetness as found in this variety is rather seldom met with among sweet apples. It is one of the best sweet apples of its season.

The variety is represented in the Station orchard only by a small graft, which has been fruiting several years. However, the tree has been observed by the writers elsewhere in Wayne County.

For a description of the tree, reference is made in part to that in "Apples of New York,"[1] as follows: "Tree rather large, moder-

[1]Vol. II, p. 110.

ately vigorous; branches long, moderately stout, filled with spurs. Form upright to roundish, open. Twigs moderately long, straight, slender, brown."

The fruit is medium in size, roundish-ovate; skin very tender, yellow, shaded and streaked with bright crimson; flesh white, tender, very fine-grained, rather juicy; flavor very sweet, with rich, pleasant aroma; quality excellent; season early September.

JONATHAN

The original Jonathan tree, a seedling of Esopus Spitzenburg, stood on the farm of Philip Rick, Ulster County, New York. The first account of the variety was published in 1826, by Judge J. Buel, of Albany, N. Y.

Jonathan has been widely disseminated, but in contrast to the majority of new varieties has found its greatest adaptability in regions other than those of its origin, where it is often unprofitably small in size. The valleys of the Ohio, Mississippi and Missouri Rivers seem to be favorable regions for the growing of Jonathan apples. In the Ozark region and in the northwestern apple-growing districts, the variety is planted extensively.

In a bulletin[1] on "Apples and Peaches in the Ozark Region," appears the following statement concerning Jonathan: "Very few varieties are grown more widely in the Ozark region than the Jonathan, and equally few are grown more successfully. Its relative importance is thus indicated. Considered from the standpoint of its intrinsic merits, it is a question if it is not the most valuable sort now being grown in this region in large quantities."

It has maintained considerable popularity as an early winter variety in Ohio, though competing in late years with a number of varieties of equally good quality and larger size as well as freedom from some of the serious weaknesses of Jonathan.

The tree is of moderate growth, with branches divergent to spreading, making an irregular, rounding, bushy top. The interlacing of the many slender twigs to be found on the inner branches makes the pruning of Jonathan a tedious task. On young trees the lower branches and twigs are often found growing toward the ground, and it is somewhat difficult to secure uniformly well-shaped trees in the nursery row.

As a remedy for the weak growth of young trees, top-grafting of Jonathan upon more vigorous stocks, such as Northern Spy, Rhode Island and other strong-growing varieties, has been sug-

[1]Gould & Fletcher, U. S. Department of Agriculture, Bureau of Plant Industry, Bul 275, p. 40.

gested. The botanical principles involved are favorable to the success of this method, although definite proofs of its desirability are difficult to secure.

The most serious weakness of the tree as growing in the Station orchard has been an extreme susceptibility to blight in all its forms. The setting of bloom is sometimes largely destroyed, from which the disease progresses to the new growth of twigs, and often to the growing fruit. The older trees are less severely attacked than the young, rapidly growing trees. Among the 38 trees of bearing age, many are showing a lack of vigor from various causes, among which appear sunscald, root diseases and cankers.

The bearing habits among these trees are also variable. The oldest trees, now 21 years from planting, have been producing annual light and medium crops, but have fallen far below the record of Grimes in yield, with an average crop of 7.8 bushels annually for the last 6-year period. Trees planted in 1900 have produced in the same period an average yield of 3.4 bushels a year, which may also be compared with the record of adjacent trees of Grimes as given under the description of that variety.

The apples are improved in color, size and uniformity by careful pruning and thinning. However, the removal of blighted twigs and branches is often in itself a severe pruning, while blight in the blossoms results in extensive but indiscriminate thinning.

The fruit is medium to small in heavy crops, or when unfavorable weather conditions check development; form roundish, with deep-set stem and calyx; skin somewhat tough, very smooth and glossy when polished; undercolor clear yellow, nearly covered with rich, bright to deep crimson, indistinctly striped; flesh yellowish, fine-grained, slightly spongy before maturity; fruit very juicy and tender when mature; flavor sprightly vinous subacid, aromatic; quality very good to excellent; season early winter; period of bloom in the Station orchard May 5 to 9; fruit ready for picking the second week of October.

The fruit as well as the tree has its weaknesses. Among these are three rather obscurely defined "fruit spots." Concerning these very little has been learned in regard to either the causes or the possible treatments. An internal breaking down of the tissues resembling water-core has been noted in Jonathan in various sections of the country. Prof. C. I. Lewis, of Oregon Agricultural College, is of the opinion[1] that this breaking down is caused by permitting the apples to hang on the tree for a longer period than is required for

[1]*Better Fruit*, VIII (Mar. 1914), 11.

best development. This is in accord with observations made in a study of water-core as occurring in King David, of which mention is made under a description of that variety. This trouble is more common in the years of light crop production.

Jonathan has a good reputation as a culinary apple. While the fruit does not cook to a fine sauce like that of some other varieties, the flavor of the cooked fruit is very rich and pleasing in whatever way it is prepared.

As a dessert apple it has many champions, who claim for it the highest quality. Owing to the differences in personal tastes this cannot be said of any variety. However, Jonathan is a very sprightly, highly flavored, refreshing apple.

Providing a remedy can be found for the prominent weaknesses of this variety, or at least a method of avoiding their recurrence in serious proportions, Jonathan may be able to retain its position as a standard commercial variety. Failing in the discovery of efficient control methods, we must turn to other varieties which are free from these troubles, or at least more resistant to them.

KING DAVID

Rich, deep coloring and a sprightly subacid flavor mark this as one of the most attractive of the varieties recently introduced. It originated more than 20 years ago on the farm of Ben Frost, in Washington County, Arkansas. The original tree was found growing in a fence row, whence it was removed to a permanent orchard, and came to the attention of the introducers (Stark Brothers Nursery Co.) in 1902.[1] It has been widely distributed within the last few years, but in the short time since its general introduction has not been tested sufficiently to furnish a basis for definite conclusions.

It is supposed to be a cross between Jonathan and Arkansas Black. The relationship with the latter variety would place it in the Winesap group; a resemblance to Winesap in form, and in the coloring of skin and flesh, strengthens this position. In fact, it resembles Winesap considerably more than it does Jonathan.

Several trees of King David are growing in the Station orchard. The oldest is now 10 years from planting, having produced fruit since 1911, with a crop of 3.2 bushels in 1914 and 2.2 bushels in 1915.

The tree is vigorous, with a divergent to spreading habit of growth, inclined to be very bushy. The main branches are stout; laterals slender; older bark is dark brownish-gray; twigs are slender, dull reddish-brown; leaves medium to small, dark green.

[1] U S Department of Agriculture, Bureau of Plant Industry, Bul 275, and N. Y. (Geneva) Agr Exp. Sta Bul 385

The tree is exceptionally healthy, so far nearly free from blight and other common diseases. Scions of this variety set in a tree otherwise severely blighted have survived these extreme conditions and are almost large enough for fruit bearing.

Fruit is medium in size; form roundish-conical, regular; stem rather short to medium, rather deeply set, as also the calyx; basin slightly furrowed suggesting that of Winesap; skin rather thin and tough, dry, harsh, glossy except where covered by a netveined scarfskin; bloom heavy, grayish and rather persistent; undercolor rich yellow, nearly covered with rich, bright crimson, shading to solid deep wine color, giving a general effect of dark purplish-red, which would be much more attractive if there were no scarfskin. The characteristic mottled effect on the lighter side constitutes another resemblance to Winesap. Flesh is decidedly yellowish, firm, crisp, juicy, slightly granular; flavor brisk subacid, richly aromatic; quality very good; season midwinter.

Period of bloom is May 5 to 9; picking season indefinite, as the fruit hangs exceptionally well, and continues to gain in color as the season progresses. However, in making an investigation as to the cause of the frequent occurrence of water-core in this variety, two pickings were made in 1914, the first October 12 and the last October 23. The results of this test with the apples in cellar storage were very interesting. When examined January 27, 1915, the early-picked apples were 100 percent sound, while those picked only 11 days later had developed 44 percent of badly water-cored apples. This would indicate the proper time for picking to be the second week in October for the Station orchard. Further tests will be made as the trees increase in fruit production.

As a dessert fruit, King David is rather sharply acid, but rich in flavor. When used for culinary purposes, the fruit requires rather less cooking than most varieties, and the acidity is here also a prominent part of the flavor. The cooked fruit has a rich yellow color. A beautiful pink jelly can be made from this variety by cooking the fruit without removing the skin. It is necessary to add considerable sugar, but the resulting jelly is of superior quality.

In cellar storage King David keeps as well as Jonathan if the water-core can be avoided. In a test of the variety in cold storage the apples were in excellent condition at the conclusion of the test, March 12.

The variety is probably adapted to the same range of territory as other members of the Winesap group. It has a promising future if the trees prove sufficiently productive, and the tendency to water-core can be counteracted by picking at the proper stage of maturity.

KINNARD

Kinnard is another member of the Winesap group. It is a firm-fleshed winter apple of good size and attractive color. It originated on the farm of Michael Kinniard, of Franklin, Williamson County, Tenn. It is not well known in Ohio. In adaptation it is probably limited to the southern counties, where most of the other members of this group are grown more successfully than at the Station.

The tree is of vigorous, upright, somewhat irregular growth, bushy, and inclined to make interfering branches and twigs. Older bark is dark gray; twigs are medium to slender, olive brown; leaves medium to small, of heavy texture, dark green. The tree is so far free from disease, and has made, perhaps, too much growth for early fruit production. Three light crops have been produced, beginning the eighth year from plantinng.

The fruit is medium to large; form oblate, inclined to conical; stem rather long; cavity wide, deep; calyx small, closed; basin wide, moderately deep, with the characteristic protuberances of the Winesap; skin thick, tough; surface dull, overspread with netveined scarfskin, which gives it a dry, harsh texture; color greenish yellow, often nearly covered with shades of bright red to carmine, mottled on the lighter side as in Winesap; flesh creamy yellow, firm, crisp, juicy, becoming granular with maturity; flavor subacid, with pleasing aroma; quality good, not as richly flavored as Winesap; season midwinter.

In common with other members of this group, the fruit is inclined to water-core if allowed to hang on the tree until the maximum color has developed.

LANKFORD

This is a late-keeping winter apple of Maryland origin. The trees in the Station orchard have produced good crops, but the fruit is poorly colored and of distinctly inferior flavor. It is possible that this locality is just outside of the northern limit of adaptation. Lankford apples from Licking County, Ohio, exhibited at the Sixth Ohio Apple Show, January, 1915, were far better in both color and quality than any grown on the trees at the Station, and the grower expressed a very favorable opinion of the variety.

The tree is of rather vigorous growth, with long slender branches. The top is open, and, aside from systematic heading back, needs but little pruning. The fruit is medium to large, roundish; color green becoming dull yellow, with a brownish-red blush and indistinct stripes; flesh firm, rather coarse, juicy; flavor subacid; quality good to very good as grown in southern Ohio. It matures in

cellar storage in midwinter, and keeps until early spring. The poorly colored fruit as grown in the Station orchard is inclined to scald in storage, and does not develop sufficient quality to make it desirable for any purpose.

Aside from its possible local adaptations, Lankford cannot compete with the standard winter apples of its season as grown in the southern half of the State.

LANSINGBURG

This variety resembles the preceding one in several ways. Its late season, poor flavor and tendency to scald in storage, indicate that it also is outside the region of its best adaptation when grown in the latitude of Wooster.

Lansingburg has long been known as a late-keeping winter apple. Before cold storage came into use as a means of lengthening the season of usefulness of the common winter apples, the few varieties which would keep in the average cellar until spring were well esteemed, though often of very inferior quality.

The tree is of medium size, divergent-spreading, bushy; bears alternate heavy and light crops annually. The fruit is small, roundish-oblong, green, becoming yellow, with a dull red blush; flesh very hard until mature, crisp, juicy; flavor mild subacid; quality fair; season late winter and spring.

Except in the southern part of the State, where a longer season favors the better maturity of Lansingburg, there seems to be very little in favor of planting this variety.

LATE STRAWBERRY

This is a desirable late-summer variety for home use because of its production of good annual crops, a long season of ripening and good quality for culinary uses. It originated in Cayuga County, New York, and was described[1] as newly introduced in 1848. It is not as well known in Ohio as it should be.

The tree is of moderate growth, divergent to spreading, rather open and easily pruned. The blossoms are sometimes attacked by blight, but otherwise the tree is exceptionally healthy. It is said to be hardy and long lived.

The trees in the Station orchard have been bearing annual crops. The average yield per tree for 5 years is a little under 10 bushels annually, ranging from 6 to 13 bushels. The crops have been such as to make thinning desirable every year, and it is possible that the thinning has aided somewhat in the annual crop production.

[1] *Am. Cultivator*, V (1848), 246

The fruit is medium to rather small in heavy crops; form roundish or inclined to oblong conic, usually irregular or ribbed; skin smooth, rather tender, showing bruises very readily; color clear yellow when mature, brightly colored with shades of pink and crimson, usually in distinct stripes and splashes, modified by a thin whitish bloom—a very attractive coloring; flesh nearly white, tender, crisp, juicy; flavor sprightly, vinous subacid, with pleasing aroma; quality very good, especially for culinary uses; period of bloom in the Station orchard May 3 to 9; fruit ripens on the tree during a rather long period, including the last week of August and the first half of September.

LINVILLE

The original tree of this variety stands on the Hoskinson homestead near the village of Linville, Licking County, Ohio. The merits of the variety were discovered about 15 years ago by F. H. Ballou, assistant horticulturist at this Station. He succeeded in propagating a number of young trees, and in top-grafting a large tree to the new variety. Of these Mr. Ballou writes: "The young trees remind me of the Stayman Winesap in their general habit and form of growth, and are fully as vigorous, if not more so. Their exceptional vigor perhaps accounts for the fact that they do not come into bearing as soon as some of the less rapid growing kinds, but I find that after they once come into bearing they are quite regular. Our large top-grafted tree (worked on Lankford) seldom fails to bear a good crop.

"The seedling was named by me because of the proximity of the original tree to the little village of Linville. We have had Linvilles that were almost a 'black-red' when fully developed in strong sunshine. This is the very best keeper we have—not excepting the Ben Davis, to which the Linville is far superior in quality, though not of the finest texture nor high in flavor as compared with Grimes, Stayman Winesap, etc. It is an 'all winter' apple in ordinary cellar storage."[1]

Specimens sent by Mr. Ballou were of superior quality and much better color than any yet produced by the tree growing in the Station orchard; in fact, they resembled highly colored Jonathans. A tree was sent by Mr. Ballou for trial in the Station orchard, and was set in 1905. It is now one of the largest trees in that section of the orchard, among a considerable number of other varieties. Growth is very vigorous, divergent, somewhat open; branches are fairly stout, rather crooked; older bark is smooth, olive gray; twigs

[1]Letter, Feb. 17, 1915.

are very stout, brown, with silver-gray scarfskin; leaves medium to large, dark green. The tree is slightly affected by blight, but is otherwise free from disease. The first crop was produced in 1912, .2 bushel; succeeding crops were: 1913, 1.5 bushels; 1914, .8 bushel; 1915, 4.7 bushels.

The fruit is medium to large, roundish-oblate, almost globular; stem short to medium, rather stout; cavity of medium width and depth; calyx large, partly open; basin rather wide, deep, abrupt; skin thin, rather tough, smooth, moderately glossy, becoming waxy in storage; undercolor dull yellow, dotted and streaked with pink shading to solid dull crimson. As grown in Licking County, the apples are completely covered with bright crimson shading to deep carmine, with indistinct streaks. Core is very small, closed; flesh yellowish, firm, crisp, juicy, a little coarse; flavor mild subacid, with the peculiar aroma of Stark, Lansingburg, Fink and others of the same (Romanite) group; quality very good.

Mr. Ballou expressed the opinion that it may be a seedling of the old Red Romanite, which is strengthened by the resemblance to other varieties of the Romanite group as above mentioned. Specimens sent to the pomologist of the U. S. Department of Agriculture were said to resemble Nero, another variety of this group.

The period of bloom in the Station orchard is May 3 to 9. The fruit has remained on the tree until the last day of October and seemed to be yet too green to pick. It is possible that here it is just outside the northern limit of adaptability for the variety, which view is supported by the general deficiency in color and quality of the fruit as compared with the specimens from Licking County.

When used as a culinary apple, it requires a longer period of cooking than the standard varieties, such as Northern Spy or Grimes, and the pieces retain their form, but the flavor of the cooked fruit is very good.

As a late-keeping variety for the southern half of the State, to take the place of varieties of the Ben Davis type, Linville seems unusually promising. If more extended trial sustains the reputation it has gained in Licking County, it is likely to become a valuable commercial variety. It evidently requires a longer period of ripening than the season affords in the latitude of Wayne County, and can be recommended for a very limited trial only in similar or more northern latitudes of the State.

LIVLAND

This variety has come into prominence in recent years; and, if the claims for it can be substantiated by actual experience with the variety under the conditions in which apples are grown in the United

States and Canada, it should gain a reputation similar to that of Yellow Transparent, with which it would come in more or less close competition.

It is an early summer apple, originally imported from Russia. A. G. Tuttle, of Barraboo, Wis., a pioneer in the importation of Russian apples for trial in the section west of the Great Lakes, writes concerning Livland: "There is no early apple east or west of better quality than Lowland Raspberry. The tree is perfect and a good bearer, and the fruit is handsomely colored."[1]

The two trees of this variety growing in the Station orchard were planted in 1904, and have made remarkable growth. The first crop of a few apples was produced by one of the trees at 8 years from planting. The same tree bore 27 apples in the season of 1915.

The tree resembles that of Yellow Transparent in almost every respect; it has an exceedingly upright and compact growth, is moderately vigorous, and so far is free from disease. The older bark is decidedly yellowish in color. Twigs are rather stout, olive brown; leaves large.

The fruit is of medium size; form roundish-conical; cavity wide, deep; basin narrow and shallow; calyx small, closed; skin smooth, rather thin and tender; undercolor pale yellowish-green, shaded and mottled with pink, streaked with bright crimson; flesh white with a greenish tinge, very crisp, juicy, with a suggestion of sponginess; flavor sprightly vinous subacid, with a pleasing aroma; quality very good; season the last of July and early August.

Further observation of this variety is necessary before recommendations based upon experience at this Station can be made regarding its further planting.

LONGFIELD

This variety is remarkable for its hardiness, productiveness, early period of blooming and its occasional excessive crops.

It was first imported from Russia by the U. S. Department of Agriculture in 1870; later it was imported from various European sources for the Iowa State College by Prof. J. L. Budd.[2] It is not well known in Ohio; and, since it must compete with Wealthy as a late summer apple, and is inferior to that variety in many ways, there seems to be no need for it in Ohio orchards unless some special adaptation appears.

[1]Budd & Hansen, *Am Horticultural Manual*, II, 117 The synonym *Lowland Raspberry* is a literal translation of the German name *Luevlander Himbeerapfel*
[2]*Apples of New York*, II, 123.

The tree is of fairly regular growth, with upright main branches and spreading laterals. The first heavy crop is often such an overload that the branches suffer severely, resulting in a very ill-shaped tree, the unbroken branches continuing to grow and spread in the direction in which they started. The growth is bushy and the twigs are slender and often drooping.

Fruit production begins early in the life of the tree, and almost annual crops are produced. The yield varies from an overload to sometimes a few dozen apples, but light crops are exceptional. Thinning is required in all the heavier crops, if size and color are to be improved and the breaking of branches prevented.

The fruit is medium to small, roundish, very smooth, with small cavity and basin. The skin is covered with a white bloom, and is very tender, showing every bruise; color clear light-green becoming pale yellow, often with a bright pink blush; flesh white, tender, very juicy; flavor rather sharp subacid, with delicate aroma; quality good, a little too acid for a dessert fruit, and not sufficiently rich in flavor for culinary uses; period of bloom the earliest of the varieties in the Station orchard—April 30 to May 6. The fruit ripens during the second and third weeks of September.

It is not adapted to cold storage and bears even the handling incident to picking very poorly. Its hardiness and productiveness are its main points of excellence; and, even though the period of bloom is so early, the buds and fruit are exceptionally resistant to freezing, and have endured temperatures of 26° to 28° F. without serious loss of fruit.

LOWELL

In some parts of Ohio this is better known as Queen Ann. Other common names are Tallow Apple and Greasy Pippin, so named because of the oily nature of the skin, which is especially noticeable after the apples have lain undisturbed for a few days after picking. It is found in the farm orchards of Ohio, but has never gained the prominence which its excellent dessert quality deserves.

The tree is of moderate growth, inclined to make a bushy top. Branches are divergent, irregular; bark is gray, shedding in small flakes from the trunk and main branches; twigs are rather slender, light reddish-brown; leaves medium to very large. The only weakness of the tree is a susceptibility to blight. Moderate annual crops of large apples have been produced, averaging 8.6 bushels annually during the last 6 years. Other trees have been observed by the writers to produce only biennial heavy crops of medium-sized apples.

A moderate amount of thinning is desirable to reduce the fruit to one on a spur or twig, thereby avoiding a large part of the early, immature windfalls, which are crowded from the clusters.

The fruit is medium to very large in favorable seasons; form roundish or somewhat oblong, irregular or ribbed, with deep-set stem and calyx; skin smooth, thin and tender, very oily when overmature; color greenish yellow, becoming clear lemon-yellow; flesh creamy white, very tender and juicy, slightly coarse; flavor mild subacid, with rich, pleasing aroma; quality excellent for dessert, and good for culinary uses, though somewhat mild in flavor when cooked.

High quality and the tendency toward annual crop production recommend this variety for more general planting in the home orchards of Ohio.

LOY

Loy is an obscure variety of Missouri origin. The tree growing in the Station orchard was planted in 1893, and is perhaps the only tree of this variety in Ohio. It has made an interesting record of fruit production in the three biennial crops it has borne during the last 6 years. The yields are 9, 35.8 and 28.8 bushels for the years 1910, 1912 and 1914, respectively, with only a few apples produced in the "off years."

The tree is large, of open, spreading growth, requiring little pruning. It is somewhat susceptible to blight, but otherwise is free from disease. The bearing habits are strictly biennial, and the last two crops have required thinning.

The fruit is medium to large, roundish, with rather broad base and apex; skin smooth, but toward the apex is marked by very numerous yellow and russet dots; color orange yellow, nearly covered with dull red, indistinctly mottled and streaked with purple; flesh firm, a little coarse, moderately juicy; flavor mild subacid, aromatic; quality good; season midwinter to spring; period of bloom May 4 to 8. The fruit is ready for picking the third week of October.

This variety is an exceptionally late keeper in cold storage. Apples have been tested in September following the year in which the apples were picked, and were considered to be among the best in flavor and condition among 30 varieties in the storage test at that time.

In cellar storage, Loy is inclined to shrivel badly if the cellar is too dry. The apples mature in March and will keep until May.

As a dessert apple it is mild and aromatic. For culinary uses it is excellent for sauce and pie.

Heavy crop production, late keeping, adaptation to cold storage and good quality should make this variety worthy of more extensive trial.

MAIDEN BLUSH

As a well-known and popular late-summer apple, Maiden Blush occupies a position similar to that of Baldwin among the winter varieties. As early as 1817 Maiden Blush was spoken of as very popular in the Philadelphia market and the best of its season for evaporation. It was named by Samuel Allinson, of Burlington, New Jersey, who first brought it to notice.[1] It has since been planted in practically every part of the United States and Canada in which apple trees would grow.

The tree is of open spreading habit, rather vigorous. Branches are stout, long, crooked; older bark is brownish or yellowish gray; twigs are slender, light brown; leaves of medium size. The tree is susceptible to blight, apple scab and apple blotch, the latter appearing first in the Station orchard on Maiden Blush.

The fruit is medium in size, oblate; skin very smooth, clear pale-yellow, with a bright pink blush; flesh creamy white, very fine-grained, moderately juicy, becoming dry and mealy when overmature; flavor subacid, of pleasing aroma; quality good to very good, especially for culinary uses; period of bloom May 4 to 10. Fruit ripens during a long season, extending from the last week of August to the second or third week of September, making several pickings necessary if all the fruit is to be gathered in the best condition.

Maiden Blush is not adapted to storage, and loses quality rapidly after picking. It is primarily an apple for the home orchard, or at most for a local market. Medium to light annual crops have been produced by the trees in the Station orchard.

Maiden Blush is generally termed a "good cooking apple"; that is, one that cooks to a fine sauce. It has sufficient acidity and aroma to give the cooked fruit a good flavor. When mature, the apples are pleasing as a dessert fruit, though somewhat dry and mealy. As a dependable late-summer variety for home use as a culinary apple, it may be planted in any part of Ohio with satisfactory results.

MANN

This variety originated as a chance seedling in the orchard of Judge Mooney, of Granby, Oswego County, N. Y. It is well known in Ohio, where it succeeds perhaps better than in the more northern states.

[1] *Apples of New York*, II, 140.

The resemblance in color to Rhode Island Greening has been used by some dealers in substituting Mann for the earlier maturing variety. It is decidedly inferior to Rhode Island Greening in quality, but is much later in season, often remaining in good condition until spring.

The tree makes a vigorous top growth, but seems somewhat deficient in root system. This is most serious in rather poorly drained, level land, the lack of drainage being probably the main factor. A susceptibility to attacks of woolly aphis may also be related to this weakness, which is manifested by the large percentage of leaning or almost prostrate trunks among trees of this variety. The fruit is susceptible to the apple blotch.

The branches are long, straight and slender, diverging from the main head of the tree. The slender branches bear heavy loads of fruit remarkably well. Alternate heavy and medium crops are produced annually by the trees growing in the Station orchard; in fact, these trees are among the most productive of the commercial varieties.

The fruit is medium to large, roundish-oblate, regular; color grass-green when picked, turning yellow late in the season—in February or March, depending on the period of maturity; flesh pale yellow, very hard, coarse, somewhat juicy, becoming more tender with maturity, and rather mealy and granular when overripe; flavor mild subacid; quality fair; season midwinter to late spring.

Mann is low in quality for both dessert and culinary uses. Its merits are found mainly in its heavy crops, in its endurance of handling and shipping and in the long, late season.

In competition with other late-keeping varieties of better quality, it cannot be recommended for planting in Ohio.

McINTOSH

This is considered to be a seedling of Fameuse. Several characteristics, especially the peculiar flavor and whiteness of the flesh, indicate the relationship of these two varieties. McIntosh is adapted to a wider range of localities than Fameuse, and is considered by some to be of higher quality. It has been disseminated widely, and is gaining in favor, especially in the northern states and Canada.

McIntosh originated in Canada, as a chance seedling on the McIntosh homestead, in Dundas County, Ontario. It has become

one of the most popular varieties grown in the Dominion, and many seedlings have been grown in the effort to increase the number of varieties of this type.[1]

In Ohio the season of McIntosh is too early for winter use, unless cold storage can be used to retard its ripening. When this is done the season is lengthened to early winter.

The tree is of exceptionally vigorous growth, with regularly divergent branches, very bushy top and many small, interlacing twigs; branches are long, straight, rather stout; older bark is brownish gray and sheds from the trunk in rather large flakes; twigs at the ends of the branches are medium to stout, of dark maroon color; leaves medium to large.

The disease susceptibility of McIntosh is limited to blight, mostly on the twigs, and apple scab on the fruit.

The bearing habits of the trees in the Station orchard have not yet become established. A tendency to excessive wood growth in most of the trees has probably hindered the production of fruit. Irregular crops have been produced by trees now 11 years from planting, ranging from a few apples to 17.6 bushels for one tree in 1915. The first apples were recorded at 7 years from planting.

The fruit is medium to large, roundish-oblate or slightly conical, often irregular in form; stem variable, short to rather long, usually stout; cavity wide and rather shallow, deeply furrowed, seldom russeted; calyx very small, tightly closed; basin narrow, shallow to medium in depth, often irregular in outline; skin thin and tender, greenish yellow, often nearly covered with a rich purplish-red, faintly streaked. The coloring is much modified by the heavy and persistent bloom of grayish or lilac color. Core is large, usually open, with numerous dark-colored seeds; flesh white, sometimes tinged pink near the skin, very tender, juicy, a little spongy near the core; flavor moderately rich subacid, with the peculiar "Fameuse" aroma; quality very good. Fruit ripens on the tree in the second and third weeks of September. The period of bloom is May 3 to 9.

The fruit is inclined to drop from the trees without developing good color, this being caused perhaps by the rather dense growth and the habit of producing fruit largely on the inner twigs and spurs. These greenish apples become peculiarly dull and "lifeless" in appearance after some time in storage. The best Ohio-grown McIntosh apples so far observed by the writers were grown in Licking County, and exhibited at the Sixth Ohio Apple Show in January, 1915.

[1]W. T. Macoun, *Characteristics of McIntosh Seedlings*, Proceedings of Am Soc. for Hort. Sci., 1911.

McIntosh develops very good quality for culinary purposes. The distinctive flavor persists, as also the acidity. When baked the flesh is tinged with red from the skin. Some persons object to the peculiar "Fameuse" flavor when the apple is used for dessert, while others are especially pleased with it.

The variety is fairly well known throughout Ohio, and its general adaptability will soon be determined by the various growers of the State.

McMAHON

Hardiness, productiveness, and the size and quality of fruit mark this variety as one of the best of the Aport group, in which Alexander and Wolf River are included.

McMahon originated in Wisconsin about 1880, and is supposed to be a seedling of Alexander. It has been recommended for planting where the climate is too severe for Northern Spy and Rhode Island Greening.

The most prominent characteristic of the tree in the Station orchard is a susceptibility to blight in all its forms. It is more vigorous and rapid in growth than Wolf River, with stout, angular branches, stout, dark-brown twigs and large leaves.

The fruit is large, oblate-conic; skin tender, showing every bruise; color more nearly white than that of any other apple described in these notes, clear pale-yellow, lighter than that of Yellow Transparent, which it also resembles in other points. The white scarfskin which covers the larger part of the apple adds to the appearance of whiteness. Fruits fully exposed to the light sometimes show a faint pink blush. The flesh is nearly snow-white, tender, crisp, very juicy; flavor sprightly acid; quality good.

The period of bloom is long and rather early, April 30 to May 8. The fruit is ready for picking in early September. The acidity is lessened somewhat by several days of ripening after picking. As a culinary apple it has sufficient acidity and flavor, but the color of the cooked fruit is pale or nearly white, and the texture variable.

In competition with Late Strawberry and Wealthy, which cover the season of McMahon, this variety must be considered as undesirable for Ohio unless some special adaptation appears.

MISSING LINK

This variety is of the same type as the well-known Willow and considered by some to be the same variety. While the resemblance is strong, the two varieties, as observed growing in the same row

in the Station orchard, seem to be distinct. Missing Link is later in season of ripening and bears heavier crops than Willow, and the tree is not so extremely susceptible to blight.

The tree is very bushy and of rapid growth, and occasionally produces a remarkable yield of fruit. One of the trees produced 23 bushels at 11 years from planting. Three years later it produced a crop of 24.2 bushels, and in 1915, 27.2 bushels. Another tree has given a total of only 14.7 bushels during the same period.

The fruit is medium to small, roundish, smooth, greenish yellow, with shading of pale pink and faint streaks of dull crimson; flesh yellowish white, somewhat tough and coarse, moderately juicy; flavor very mild subacid, becoming nearly sweet when mature; quality fair for dessert, rather poor for culinary uses. The fruit matures in late winter and keeps until late spring.

The period of bloom is May 3 to 9. The fruit is ready for picking the last of October. In quality it compares favorably with Ben Davis, but is a little better for dessert and not as good for culinary uses.

It is perhaps better adapted to the southern part of Ohio than elsewhere in the State, but is deficient in quality and cannot be recommended for general planting.

MOTHER

This excellent but little-known dessert variety originated in Massachusetts early in the last century. "The small size of the tree, earliness of ripening, and the relative susceptibility to apple scab appear to have held it out of the market lists until recently. * * * * * It appears worthy of testing in all districts where varieties like Baldwin and Esopus succeed, to which it is evidently closely related."[1]

As growing in the Station orchard, the tree is of medium size, upright-divergent habit of growth, with a very shapely top requiring little pruning. Top-grafts of this variety growing on Fink seem more vigorous and are of strong, upright growth. Branches are long, somewhat slender, with older bark of a dark-gray color, roughened by numerous yellow lenticels; twigs stout, brown; leaves large, dark green.

The tree is so far quite free from disease. The upright growth makes low heading desirable to insure shade for the trunk and to avoid sunscald. It has given three full crops of fruit and one small crop in the last 6 years, during which one setting of bloom was destroyed by a late freeze. The full crops have required thinning.

[1]Wm A Taylor, *Promising New Fruits*, Yearbook, U S Dept of Agriculture (1909), p 376.

The fruit is medium in size; form roundish-conic to oblong; stem of medium length, stout; cavity and basin medium in width and depth; calyx small, tightly closed, green; skin rather thick and tough, becoming waxy in storage. The russet dots and heavy scarf-skin give the skin a harsh texture. Undercolor is yellow, nearly covered with shadings of rich dark crimson marked with streaks of carmine; core medium sized, closed; flesh very firm until mature, rich yellow, juicy, crisp, fine-grained; flavor rich aromatic subacid; quality excellent for nearly all uses.

In period of bloom this is one of the latest of the varieties grown in the Station orchard—May 7 to 13 for 3 normal years. This places it in the periods of bloom of Ralls, Ingram, Northern Spy and Rome Beauty. It would be difficult to determine just how much advantage is secured by the late-blooming habit, as some varieties are as resistant to the effects of freezing when the apples are three-eighths to one-half inch in diameter, as they are just before the blossom buds open. However, it can be said from experience with these very early- and late-blooming varieties during late freezes that the blossom buds of the latter are as resistant as the hardiest of the earlier varieties after the petals have fallen.

The fruit is ready to pick by the second week of September. It drops from the tree before becoming mellow, and its exceptional firmness at picking time should make it desirable for shipping, at least for short distances. If handled carefully it can be stored in a cellar for a month or two, or can be kept in cold storage until early winter with little loss. A tendency to shrivel if the cellar is too dry is a rather serious fault. With long storage the coloring becomes dull and unattractive, and much of the rich flavor is lost.

For dessert uses, Mother is one of the finest of all the varieties of apples. If kept in a cool place for a few days after picking to insure proper maturity, it becomes one of the most delightful of dessert fruits. Its richly aromatic subacid flavor is relished by the majority of persons, and should satisfy the most exacting tastes. In this condition it is also exceptionally good for all culinary uses, especially for pie and as a baked apple.

With the late period of bloom, a healthy tree of moderate growth, excellent quality and exceptional firmness when ready for picking, this variety should become better known and more extensively planted in Ohio, especially in the home orchard.

MOYER

Moyer is an apple of uncertain origin, a chance seedling distinctly of the Bellflower group, with the ovate form, yellow coloring

and large, open core common to other members of the group. It is not well known in Ohio, and has failed to become of commercial importance largely because of its light color, tenderness of flesh and competition with a great many well-known varieties of the same season.

The tree is moderately vigorous, spreading, bushy. Branches are slender, with older bark gray; twigs slender, brown, often drooping at the ends of the branches; leaves medium to large, rather light green. A slight susceptibility to blight is the only weakness appearing so far. The slender growth requires careful training when the tree is small to secure a well-shaped framework of branches.

Heavy biennial crops have been produced, and the tree is said to come into bearing rather early. Thinning has been necessary with every crop, and a greater number of apples have been removed from the tree than were left to mature. Three heavy crops during the last 6 years made a total of 83.4 bushels. The only indication of annual bearing, perhaps due to thinning, was an "off-year" crop of 3.2 bushels produced in 1913, of overgrown, imperfect fruit, very poor in keeping quality.

The fruit is medium in size; form ovate or oblong; stem long, slender; cavity narrow, shallow, green or sometimes a little russet; calyx medium in size, closed; basin narrow, rather shallow, deeply furrowed; skin rather thick and tough but easily injured on account of the tender flesh; smooth, becoming very oily in storage; color clear lemon-yellow, blushed with bright pink, very attractive, but showing every bruise; core large, open, with seeds numerous; flesh white with tinge of yellow, very tender and fine-grained when mature, very juicy; flavor mild subacid, aromatic; quality very good.

Period of bloom in the Station orchard is May 3 to 10. The fruit is ready for picking the second or third week of October. It matures quickly in the cellar and is at its best in December. If handled carefully and placed in cold storage soon after picking, the season is extended to midwinter or even later, with little loss of quality.

The long stem is a factor unfavorable to handling this variety in bulk, and, with the light color and tender flesh, Moyer is limited practically to home use and local market. It is as well adapted to box packing as Yellow Bellflower, Ortley, Banana and other yellow apples, and might develop in this direction as a commercial variety.

Moyer as a dessert apple is relished by many persons who prefer the milder-flavored fruits. For culinary uses the variety is less

satisfactory; the color of the cooked fruit is pale and the texture somewhat lumpy and stringy, but the flavor is good, and the fruit requires much less sugar than most of the subacid varieties.

As a productive, mild-flavored, early-winter apple, this variety should become better known in Ohio, especially in the northern half of the State.

Moyer can be planted as a substitute for Belmont, which it resembles somewhat, but has few of its weaknesses and is more productive and uniform in quality.

MUNSON

This is a yellow sweet apple, in season the last week of August and the first week of September. The tree is unusually vigorous, spreading, larger than Baldwin of the same age. The fruit is oblate-conic, smooth, yellow, firm fleshed, moderately juicy, very sweet. Crop production is variable, from a few bushels to an occasional very heavy crop.

The fruit has been found desirable by some who used it for thickening apple butter, which required less sugar than when acid apples were used.

Munson follows the season of Golden Sweet, and is desirable where apples of this type are in demand.

Since the tree is healthy and vigorous, it might be useful as a stock for top-working to less vigorous varieties.

NERO

This has been designated as an improved Minkler. It belongs to the Romanite group and much resembles Minkler. It originated in New Jersey.

Nero is represented in the Station orchard by several grafts and two young trees. The oldest graft, a large top-graft on Golden Russet, has been fruiting for several years and has produced good to heavy annual crops. The main branches are upright, with numerous slender laterals and twigs often at right angles to the main branches. It is quite free from disease, but the younger grafts are susceptible to blight. The trees produced their first light crop in 1915, at 6 years from planting.

The fruit is medium to large, roundish-oblate, regular in form; skin smooth, thick and tough, becoming waxy in storage; undercolor yellow, nearly covered with shadings of bright pink and stripes of crimson; flesh greenish yellow, firm, crisp, juicy; flavor subacid, with pleasing aroma; quality good.

The period of bloom is May 2 to 9. The fruit has been picked the last week of October, but this may have been rather late, as the apples hang well to the tree.

A tendency to water-core has been noted in the apples, perhaps due to the fact that the fruit was left on the tree too long. It keeps in cellar storage often until March or April.

As a dessert apple Nero is good when not overmature. For culinary uses it is almost worthless, as it becomes deficient in flavor and texture and requires prolonged cooking.

In competition with other late-keeping varieties of superior quality and better adaptation to Ohio conditions, this variety cannot be recommended for general planting.

NORTHERN SPY

The Northern Spy has been a favorite apple among growers and consumers for many years. It is considered by many to be the standard of quality for both dessert and culinary uses. When well grown and properly matured, it is probably the best culinary apple that has ever been introduced. This, however, limits it to the districts east and southeast of the Great Lakes, in a region to which Baldwin and Rhode Island Greening are also well adapted.

The development of Northern Spy as commercial variety shows its adaptation quite plainly, in that it occupies third place in commercial importance and first place in quality in the eastern markets when compared with the varieties named above.

It originated in a seedling orchard at East Bloomfield, N. Y., in the beginning of the nineteenth century. It was almost unknown for nearly 50 years, but, since its listing by the American Polomogical Society as a variety worthy of general cultivation, it has been extensively planted in the more northern apple-growing districts. It has also been planted to some extent, perhaps, in every other district in the United States and Canada. That it is known in Australia[1] is shown by the recommendation for planting of Northern Spy in the higher altitudes of New South Wales, and for its use as a highly desirable stock for top-working. It is mentioned also in a report of observations on South American fruit production in which a Chilean orchard enterprise was described.[2]

The strong upright-divergent habit of growth usually develops a shapely top, but the branches are inclined to become too long and slender and require much heading back. For the same reason low heading is advisable. Another difficulty arises from the tendency

[1]Farmers' Bulletins of New South Wales
[2]Proceedings of Soc for Hort Sci (1913), p 126

of the main branches to become closely grouped when the head of the tree is formed. If a central stem is allowed to grow for a few years with all the side branches which may start, the few main scaffold branches may then be selected with regard to space for proper development.

Blight is the only disease attacking the Northern Spy tree to an important extent, and is confined mainly to the blossoms. Blister canker has been found on old trees in the Station orchard. Apple scab is likely to attack both leaves and fruit if spraying is neglected.

The trees in the Station orchard have produced variable annual crops, from a few apples to 21½ bushels. These nine trees were set in 1893. An average yearly crop of 6.4 bushels per tree is shown by the yields recorded for the last 6 years. Profitable crops are not often produced before the twelfth or fifteenth year, but the trees usually make up in vigor and long life what they lack in early fruit bearing. It is evident that the vigorous early growth is not favorable to fruit production.

The fruit is usually very large, especially from young trees, and, as grown in the Station orchard, it matures on the trees by the second week of October, and has but a short season of usefulness, seldom keeping until midwinter. The coloring is variable, and the greenish fruits are usually lacking in quality. From old trees the fruit is much smaller, and if carefully handled will keep in cellar storage until January.

Prof. W. T. Macoun, of Ottawa, Canada, in trying to secure hardy varieties of apples of the type of Northern Spy, grew a number of seedlings of that variety; and, when these came to fruiting age, it was found that 36 percent distinctly resembled Northern Spy in flavor, and 29 percent were considered as good to very good in quality. Prof. Macoun writes: "We now have seedlings with the flavor of Northern Spy and in season from September until spring." The trees were found to be hardier than those of the parent variety.[1]

The medium to large size, roundish-conic form, wide, deep cavity, deep basin and large, open core are characters more or less constant in Northern Spy. Well-colored fruits are clear yellow shaded with bright red tints, usually distinctly streaked, the yellow undercolor making the red almost scarlet.

Highly colored fruits are sometimes a solid dull-crimson with indistinct streaks. Flesh is yellow, somewhat firm, crisp, juicy, tender and slightly granular when mature; flavor rich aromatic subacid; quality excellent for all purposes.

[1]Proceedings of Soc for Hort. Sci. (1913), p 81.

Northern Spy is in the late-blooming class. The leaves are also rather slow to unfold. An average for 4 normal years gives May 7 to 11 as the period of bloom. The first ripe windfalls are found the last week of September, and the fruit is ready for picking by the second week of October. It matures rapidly and must be picked when ready or considerable loss may result. An inclination to crack open, especially in rainy weather, adds to the loss under unfavorable conditions.

The tender skin makes careful handling imperative, and the minor insect injuries, such as stings and curculio punctures, as well as the abrasions and scratches due to rubbing against branches, seem to be more common on Northern Spy than with most other winter varieties.

When considered from the standpoint of quality, Northern Spy, Rhode Island Greening, Baldwin and "the old-fashioned Rambo" occupy similar positions in the mind of the average consumer. The majority of persons give Northern Spy the first place as a culinary apple. The golden-yellow color and rich aromatic flavor of the cooked fruit is equalled by those of few other varieties.

In adaptability to Ohio conditions the variety as a winter apple is limited to the northern counties. As far south as this Station in Wayne County, the fruit matures so early in the season that it cannot be considered to be any more than a late-fall and early-winter variety—not as good in this respect as Baldwin. Farther south it must be considered as a fall variety to be used soon after picking.

The common objection to Northern Spy as a commercial variety, as well as for home use, is that we must wait too long for the trees to come into bearing. It must be admitted that the objection is made on good grounds, since there are several other good varieties of the same season which begin to bear fruit at an early age. Trees in sod bear at an earlier age than those under cultivation.

However, the following points remain in favor of Northern Spy: vigor and long life of the tree; adaptation to a district near some of the largest markets in the country; popularity, based on the sound foundation of high quality; and an excellence of flavor and texture equalled by those of few other varieties, and perhaps excelled by none.

NORTHWESTERN (GREENING)

This variety, of Wisconsin origin, is adapted to the northern states because of its ability to withstand the severe climate prevailing in those sections. Under Ohio conditions this is of little

consequence; and the variety being so much inferior to the Rhode Island Greening and to other varieties, such as Grimes, Stayman Winesap and Rome Beauty, which are well adapted to Ohio conditions, there seems little reason for planting an apple tree when the fruit has such a low quality as that of Northwestern.

The tree is large and vigorous, inclined to be bushy. Alternate light and very heavy annual crops are the rule.

The fruit is large, roundish, inclined to conical, with very smooth, thin, tough skin; color pale yellowish-green, very seldom showing an orange blush; flesh greenish white, firm, rather coarse, juicy; flavor subacid; quality rather poor to good, depending on the stage of maturity; season late winter and spring. The fruit is especially susceptible to apple blotch, bitter rot and in storage to the blue mold, which follows almost every injury incident to handling the fruit, and which is responsible for the greater part of the early decay which characterizes this variety in cellar storage.

Tests made with this variety for culinary uses gave very unsatisfactory results, and before maturity the apples are almost worthless for any purpose.

Considering the low quality when compared with other varieties well adapted to Ohio conditions, Northwestern cannot be recommended for planting in this State.

NOTTINGHAM

This variety is remarkable for the low, spreading habit of the tree. The lower branches are long and horizontal, and very little permanent upright growth is made. The variety originated in Pennsylvania.

The fruit resembles that of Stark in color and form. Size is medium to very large; form roundish-conical with rather broad base; skin thin and tough, with surface dull and roughened by prominent russet dots; color yellowish green, washed and streaked with dull brownish-crimson; flesh greenish white, rather firm, a little coarse and granular, moderately juicy; quality fair to good, with pleasing flavor; season midwinter, but fruit keeps until April.

Crop production has been rather irregular, but several good crops are recorded for trees planted in 1900. As a variety it is not especially desirable, but the spreading growth might be useful in cordon training for the main arms of the tree, to be later grafted to other varieties.

OHIO NONPAREIL

This is an Ohio variety, having originated near Massillon, in Stark County. It is perhaps the best dessert apple of its season, and is also one of the best in quality among the varieties originating in this State.

The tree is rather slow in coming into bearing, and is in general somewhat unreliable in crop production, which factors have been probably the main reasons for the rather meager recognition accorded the variety by fruit growers.

The tree is of vigorous growth. Branches are upright-divergent, somewhat irregular, inclined to make a rather dense, round top; twigs medium to stout; leaves large. A susceptibility to blight is perhaps the only serious weakness, which sometimes develops dangerous proportions in the young trees. A large tree standing in a side yard near one of the dwellings on the Station farm has made a remarkably strong growth, but has produced comparatively little fruit. Top-grafts on Stark have produced light crops annually. Some old trees in a neighboring orchard have produced fine crops of good-sized fruit annually, and the demand for the apples from local consumers included even the windfalls, showing the popular appreciation of high-quality apples when they are available.

The fruit is usually large because of the distribution through the tree and the tendency to set but one apple from a cluster of bloom; form oblate, unsymmetrical; skin thin, tough, waxy; color pale yellow, washed and striped with bright pink and crimson, highly colored specimens being nearly solid crimson—general effect red striped; flesh creamy white, tender, fine-grained, very juicy; flavor mild aromatic subacid; quality excellent.

The period of bloom is May 2 to 9. The apples ripen on the tree during the third and fourth weeks of September, and will keep in a cool cellar until the middle of November.

For use as a culinary apple, Ohio Nonpareil is rather mild in flavor, especially in sauce, but it is excellent for baking. As a dessert apple it ranks with Lowell, Jefferis and Northern Spy.

In an orchard where permanency is at least as desirable as early fruit production, Ohio Nonpareil is worthy of a place as an excellent variety for late fall. In early bearing and productiveness it compares unfavorably with Wealthy of the same season.

OLDENBURG

This is perhaps the most valuable of the Russian varieties introduced to cultivation in the United States. It was imported to England from Russia about 1815, and was brought to the New England

states through importation from England by the Massachusetts Horticultural Society about 1835.[1] It has become widely disseminated, often under the name "Duchess" or the full name of "Duchess of Oldenburg," and seems adapted to the same range of territory as Wealthy and Yellow Transparent. This includes practically all the apple-growing districts of the United States and Canada,[2] and by the production of seedlings the planting of apples of this type is being extended to regions where the climate has been too severe for the ordinary hardy varieties.

The trees in the Station orchard are of various ages, from 4 to 21 years from planting, and include both dwarf and standard trees. Mature trees are considerably smaller than Baldwins of the same age, and little pruning is necessary after the bearing habit has become established.

The early growth is vigorous and rapid, making a tree which can bear a bushel or more of fruit at the first crop. The branches are upright-divergent, but become more spreading with fruit bearing. The older bark is smooth and gray. Twigs are stout, brown or maroon; leaves large; blossoms produced largely on spurs. Disease susceptibility is limited to blight, which is most serious on the younger, rapidly growing trees and on the blossoms of older trees.

The bearing habits of the trees in the Station orchard are rather variable. One dwarf tree set in 1909 produced a bushel of fine apples in 1914. An older tree has been bearing alternate medium and heavy crops annually, while the oldest trees have maintained an almost strictly biennial habit of bearing. A very light "off-year" crop on these trees in 1913 is probably an effect of the regular thinning. The highest yield recorded for one of these trees was 20.5 bushels, the crop having been thinned.

The fruit is medium to large, roundish-oblate; skin moderately thick and tough, smooth, usually showing a rather heavy bloom; ground color greenish yellow, shaded with pink, splashed and streaked with bright crimson—general color effect red streaked; core rather large, closed or slightly open; flesh creamy white, crisp, juicy, somewhat firm until mature; flavor brisk acid, becoming milder when mature, with pleasing aroma; quality very good, especially for culinary uses. The acid flavor is a little too sharp for most palates when the apple is used for dessert.

[1] *Apples of New York*, II, 152
[2] U. S. Dept. of Agriculture, Bureau of Plant Industry, Bul 151, p 19.

The period of bloom is rather early, May 2 to 8. The fruit ripens during the first and second weeks of August. Several pickings may be made, but the apples should not be left too long on account of a tendency to water-core. Careful attention to pruning and thinning will be rewarded by increase in size, color and uniformity of the fruit.

There is a short interval of time between Yellow Transparent and Oldenburg in season of ripening, but the first well-colored apples of the latter variety can be used for culinary purposes as soon as the season of Transparent has ended. As an early commercial variety for shipping, Oldenburg is perhaps the more reliable, as it bears handling much better than Transparent. For the home orchard it is the most satisfactory variety of its season.

Oldenburg is very well known throughout Ohio, and recommendations regarding its planting would seem to be superfluous. It is adapted to all parts of the State, and can be depended upon as a good summer variety for culinary use. It is often used as a filler.

OLIVER RED

Two prominent characteristics make this variety a very interesting one: It has a rich coloring of solid crimson with a few streaks of darker color; it has also an exceptionally long period of usefulness, maturing in December and remaining in good condition until April or May.

Oliver Red originated early in the nineteenth century on the John Oliver farm, 7 miles south of Lincoln, Washington County, Ark. It was first propagated by Earles Holt of the same county, about the middle of the century, since which time it has been known and propagated locally under the name of Oliver's Red. Its exhibition with other Arkansas apples, at the World's Columbian Exposition in Chicago in 1893 and the Cotton States Exposition at Atlanta in 1895, brought the variety into prominence. Since then it has been widely disseminated by Stark Brothers Nurseries and Orchards Company under the trade-mark name "Senator."[1]

The tree, as growing in the Station orchard, is upright to divergent, moderately vigorous, somewhat open in habit of growth and easily pruned. Branches are fairly stout with older bark of a characteristic yellowish or olive-brown color; twigs stout, maroon; leaves medium to small. The trees have been found susceptible to blight to a variable extent, and one tree was removed on account of a large crown gall. A section of a nursery row containing 34 trees

[1] *Promising New Fruits*, Yearbook, U S Dept of Agriculture (1906), p 358

of Oliver Red, root-grafted on seedling stocks, were dug in the fall of 1915, and every one was found to be affected by crown gall at or just above the point of union. The tree is said to be somewhat subject to sunscald, and low heading is advised to prevent this trouble.

The bearing habits of these trees have been somewhat irregular. Young trees have produced the first fruit at 8 years from planting. Alternate heavy and light annual crop production is indicated by the record of yields.

The fruit is medium to large; form oblate; stem short to medium, rather slender; cavity of medium depth and width; calyx small, partly open; basin characteristically wide and saucer-shaped, furrowed and wrinkled; skin thick and tough, roughened only by numerous, large, yellow and russet dots. The surface becomes very oily in storage, preventing shriveling, but also gathering much dust and becoming very grimy if stored in open containers. Ground color is golden yellow, usually nearly or quite covered with rich crimson, and showing a few broken streaks of dark color; core rather small, partly open; flesh rich, creamy yellow, often tinged with pink, especially near the calyx and along the core lines; texture rather firm, moderately juicy, a little coarse and granular; flavor rich aromatic subacid; quality excellent, especially for dessert.

Period of bloom extends from May 4 to 9. The fruit is ready for picking the third week of October, and is usually fully colored by that time. Full flavor and maximum quality are reached in December, and are maintained for a surprisingly long time after maturity.

Storage tests have been made with this variety in which one test was concluded in May with 88 percent of the apples in edible condition and with fairly good flavor. These apples were entirely sound at the beginning of the test, which was made in cellar storage. A test made in cold storage was concluded August 24 with 44 percent of sound apples.

Cooking tests made with Oliver Red at various times during the season have given highly satisfactory results when it was used in pie and as a baked apple. The sauce is also of good flavor, but the texture is somewhat stringy and granular. As a dessert apple it is esteemed by some as equal to Grimes or Northern Spy, but it is not quite as fine in texture or as rich in flavor. A general rating would perhaps place it as second class for all purposes.

Oliver Red has not been grown in Ohio for a sufficiently long period to establish its merits fully, but on the basis of observations

made at the Station it seems worthy of more extended trial. Experience with this variety indicates that the trees must be properly trained and otherwise well cared for to be fully successful.

ONTARIO

This is one of the two varieties described in these notes which are known to be the result of crosses made by the definite transfer of pollen from one variety to the flower of another. In the case of Ontario, this was done by Charles Arnold, of Paris, Ontario, in crossing Northern Spy with Wagener.

A resemblance to both parents can be found in the Ontario. The oblate form, irregular or ribbed outline and the dull shades of green and red are characteristic of Wagener, while the large size and acid flavor are found in Northern Spy.

It has been found valuable in some sections of Canada, especially in southern Ontario.[1]

The trees growing in the Station orchard have made a vigorous growth, but are susceptible to blight in all its forms. The bearing habits have not become established. One of the trees produced 4 bushels of large apples at 10 years from planting, and some fruit was produced the year before, which was the first crop recorded for the tree. Heavy crops of extremely large apples were produced by the trees in 1915.

The fruit is usually large, oblate, irregular, with coloring of dull green and red. The flesh is greenish white, juicy; flavor sharp acid, lacking the rich aroma and fine texture which distinguishes Northern Spy; quality fair; season early midwinter; period of bloom rather late, May 5 to 10; picking season about the third week of October.

The fruit is too acid for dessert use. If the writers were to give a personal opinion, they would say that it is too acid for any use, though the authority cited above gives the quality as "very good for all purposes." From this it is evident that Ontario develops better quality in the section where it originated than it has shown at this Station.

Since there are many better varieties of the same season adapted to Ohio conditions, it seems best not to recommend Ontario for planting in this State.

PEASE

This is a dessert apple of very pleasing quality, ripening in September. The variety originated in the seedling orchard of

[1] *Fruits of Ontario* (1914), p 61

Walter Pease, Somers, Conn., early in the nineteenth century. It attained only local prominence until recent years, when it has been propagated more extensively.

The tree is of moderate growth, nearly upright, rather open, requiring little pruning. Alternate heavy and light annual crops are produced. A graft of this variety on an old Northern Spy tree produced medium to heavy crops annually. The tree now growing in the Station orchard is declining in vigor, possibly on account of being planted on a wet, "springy" slope, which at first was not underdrained.

The fruit is medium to very large, roundish; cavity and basin wide and deep; skin moderately thin and tender, dry and somewhat harsh to the touch; color greenish yellow, shaded and mottled with dull pink and crimson, the coloring being much modified by a heavy, grayish scarfskin—general effect rather dull and unattractive; flesh pale yellow, moderately juicy, with rich, very pleasant aroma; quality excellent for dessert.

The period of bloom is May 5 to 9; picking season the middle of September, fruit ripening through a rather long period. Some of the apples can be kept in a cool cellar until early winter.

The fruit is rather mild in flavor for culinary uses, but if used before it reaches full maturity it is highly satisfactory, being rich in flavor and very tender in texture.

The variety seems worthy of more extensive planting in the home orchard on account of its excellent quality and regular crop production.

PECK

Peck is a variety found mostly in old orchards, widely distributed and well known throughout the eastern apple-growing sections. It is better known by the full name "Peck's Pleasant."

A general deficiency in crop production is responsible for its lack of popularity, a characteristic which has been shown by the tree, now 22 years from planting in the Station orchard. During the last 6-year period it has produced an average of only 4.8 bushels per year.

The tree is moderately vigorous, somewhat spreading and bushy in habit of growth. It is nearly free from disease, a susceptibility to twig blight being the only weakness so far appearing.

The fruit is medium to large, oblate, inclined to conical, irregular in outline, with a short, usually thick and fleshy stem, often joined to a fleshy protuberance in the cavity commonly termed a "lip." The skin is smooth, thin, tough, becoming waxy in storage;

color grass-green, changing with maturity to a clear pale yellow, and sometimes showing a pink blush; flesh yellowish white, firm, crisp, juicy, becoming rather dry and granular after maturity; flavor mild aromatic subacid; quality very good.

Period of bloom is rather late, May 6 to 10. The fruit is ready for picking the third week of October, and reaches maturity in cellar storage in January or February, and will retain good flavor until April. A tendency to scald in storage is the most serious weakness of the fruit.

As a culinary apple, it is very good until the end of its season. The fine texture and good flavor of the cooked fruit makes it highly satisfactory in all methods of preparation. For dessert purposes it is truly a "pleasant" apple.

The deficiency in productiveness is so common that it seems to be improbable that the fault can be corrected by a change of either cultural or other methods of orchard practice, and the gradual disappearance of the variety from cultivation will be observed with regret by all who have known its excellent qualities.

PEWAUKEE

This variety resulted from seed produced after hand-pollination of Oldenburg blossoms with Northern Spy pollen, by George P. Peffer, of Pewaukee, Wisconsin. Various characteristics of Oldenburg prevail, especially in the tree and largely in the fruit, almost to the exclusion of every evidence of Northern Spy parentage.

The trees planted in the Station orchard have fared rather badly, in that blight in all forms has been present on them, in addition to root diseases, perhaps due to collar rot. One tree was removed several years ago, and the other is in such condition that its removal will soon be necessary. A few fruit growers in the State have found Pewaukee to be a profitable variety in their orchards. It is quite productive in favorable locations.

The fruit is medium to large, roundish, much resembling Oldenburg in coloring, the heavy lilac bloom and the sharp acidity of the flavor, which seems to increase after ripening. The flesh is creamy white, crisp, a little tough and coarse, juicy; quality fair to good for culinary purposes. The apple is in season from October to December and is a rather poor keeper in cellar storage.

So many better varieties of the same season are adapted to Ohio conditions that Pewaukee cannot be recommended for planting anywhere in the State.

RALLS

More than 50 synonyms have been recorded for this variety, consisting mainly of the different ways of spelling the names Ralls, Genet, Geneton, Rockremain and their combinations. It is supposed to have originated in Virginia, and is in more or less common cultivation throughout the south-central states and as far north as southern Michigan as well as westward to the Ozark region. In Ohio it is perhaps most successful in the sections where apple scab and bitter rot are least prevalent.

The tree is not a strong grower, but is thrifty and healthy, with the one exception of being susceptible to attacks of blossom blight, which in severe cases destroys nearly the entire setting of bloom. The disease seldom progresses farther than the blossom spur, and cankers are rarely found.

The most prominent characteristic is the late period of bloom, and corresponding period of coming out in leaf. The average of a 4-year record is May 8 to 15—the latest period of bloom among more than 400 varieties represented in the Station orchard. At least two instances have been observed during the last 5 years, in which this late-blooming habit has served to avoid serious injury by late frosts. As discussed in the description of Northern Spy, the relative advantage of this depends on the degree of hardiness of the newly formed fruits among the early-blooming varieties, with which comparisons were made.

The three trees of Ralls, now 21 years from planting, have produced a total of 150.8 bushels of apples during a 5-year period. This includes a year in which two of the trees produced no crop. The combined effect of thinning and of the occasional destruction of a large part of the bloom by blight seems to be changing the bearing habit to the production of moderate annual crops. Ralls is inclined to set fruit from an unusually large proportion of the blossoms, and full clusters of five to seven apples are often found. The "June drop" does not affect this variety, and thinning becomes imperative if good size of fruit is to be secured. Coloring is also improved.

The fruit is medium in size, roundish-conical; skin thick and tough, enduring handling extremely well, rather dry and harsh, with much gray-pink scarfskin; color dull green, becoming greenish yellow when mature, dotted and streaked with dull crimson—generally rather unattractive in color; flesh nearly white, with greenish or yellow veinings, very firm, crisp, juicy, somewhat tough unless well matured; flavor mild subacid, with pleasing aroma; quality very good when mature.

The fruit is ready for picking the last week of October, and in a good cellar will keep until the following May or June. The maximum quality is reached in March, and the apples have been kept until July with 32 percent of sound fruit in edible condition. The variety does not mature properly in cold storage, and may be kept an entire year with comparatively little change except as conditions may induce the extreme shriveling to which the variety is liable.

The mild flavor of Ralls does not permit its extensive use as a culinary apple. The best results have been secured when it is used for pie. As a dessert fruit, Ralls is refreshing on account of its juiciness and aroma; and, since its season of usefulness is so long, it becomes perhaps the best late-keeping apple in common cultivation in the districts to which it is adapted. The nearest competitor in this respect is the Ingram, previously described.

The susceptibility to apple scab and bitter rot, which are more serious in the southern parts of Ohio than at the Station in Wayne County, makes careful spraying necessary with this variety. The tendency to overbear and produce small, poorly colored fruit can be overcome to a large extent by good pruning and rigorous thinning.

RAMBO

The "little old-fashioned Rambo" is one of the varieties most readily recalled by the average city dweller whose early days were spent on a farm. It is one of the oldest of American varieties. According to its limited early history, it must have been in cultivation in Delaware, Pennsylvania and New Jersey in the latter part of the eighteenth century. Rambo is known throughout the eastern and central states, and is found in almost every old orchard in Ohio.

It has never reached a position of even moderate commercial importance because it failed to fulfill several requirements, such as the large size, red color and early crop production of some varieties for which fruit growers have so often sacrificed quality and usefulness.

However, it has maintained its position in the home orchard, as well as in the memory of apple consumers, because the name "Rambo" has always been associated with the high quality of the fruit in whatever use was made of it. Some of the earliest horticultural experiences of one of the writers were connected with the pruning, spraying and harvesting of apples in the farm orchard, in which seven trees of Rambo figured largely in the total fruit production as well as in the financial returns.

The tree makes a vigorous early growth, usually very upright with strong leaders, and if not carefully trained is liable to make a poorly balanced tree, or perhaps several acute crotches, which may later become the breaking point when heavy crops are produced. The lateral branches are often spreading or horizontal, and are thickly set with the spurs on which the fruit is borne. The faults which are usually associated with Rambo are its susceptibility to apple scab, the habit of overbearing and consequent small size of the fruit after the bearing habits have become well established. The apple scab has been controlled by the spraying as followed at the Station, and thorough thinning with proper attention to the fertility of the soil will serve to maintain good size in the fruit. However, a Rambo of medium or small size will keep in good condition much longer than a soft, overgrown fruit, such as found on young trees or in light crops on older trees.

The bearing habits of Rambo are variable, though heavy biennial crops are the rule. The tree in the Station orchard has been bearing a little more than 10 bushels annually during the last 6-year period. Some thinning has been necessary on this tree.

The fruit is medium to small, roundish-oblate, greenish yellow streaked with dull red, not often highly colored; flesh nearly white with greenish tinge, tender and fine-grained, very juicy before maturity, but becoming very dry and mealy when overripe; quality excellent for all purposes when mature. It reaches its maximum quality within a few weeks after picking, and soon loses flavor in cellar storage. The apples are ready for picking the first or second week of September, and in favorable seasons can be kept until midwinter. It is highly satisfactory as a culinary apple from the first well-colored windfalls until the end of its season, which sometimes extends into February.

Rambo at its best is perhaps not to be considered as a commercial variety, though the fact that it is well known and popular as an apple of high quality might cause a local demand. It is too tender for shipping, and is best adapted to the home orchard and to northern and central Ohio conditions, as it ripens too early in southern Ohio to be considered as more than a late fall variety.

RAMSDELL

This is a red, sweet apple of good size, ripening on the tree early in October. The tree is very upright in habit of growth, inclined to be bushy and to form many slender branches. The first fruits

in the Station orchard were produced at 8 years from planting. The fruit is inclined to mature quickly and to become mealy and dry, losing flavor rapidly.

Though of a very attractive red color and of good, very sweet flavor when mature, the variety does not appear to be worthy of general planting because of its extremely short period of usefulness.

RED CANADA

This is a winter apple of high quality and exceptionally long season. It is listed by some nurserymen under the name of Steele's Red Winter. In some parts of Ohio it is known as Richfield Nonsuch. Its origin is probably in New England,[1] and the variety was described as early as 1822, under the name of Nonsuch. It is said to be somewhat particular as to soils and seems to succeed best on the lighter, gravelly loams. On the silt loam soil of the Station farm, Red Canada has made a good growth of tree and produced satisfactory crops of fruit.

The tree is moderately vigorous, but does not grow as rapidly as Northern Spy or Baldwin. The branches are divergent, rather long and slender, with many laterals and twigs, making a bushy, rounded top. The older bark is dark gray or brownish. Twigs are slender, rather light brown or olive; leaves medium to small. Moderate annual crops have been produced by these trees, now 21 year from planting. An average yearly production has been recorded of nearly 9 bushels per tree for the last 6-year period. While this is not nearly equal to the performance of three Baldwin trees in the same orchard, the fruit has been uniformly large, with a low percentage of second-grade fruit, and the crops have required little or no thinning. They have also been practically free from diseases of any kind.

The fruit is medium to large, oblate, inclined to conical; stem short to medium, rather slender; skin moderately thick and tough, usually smooth over the base of the fruit, becoming somewhat harsh and rough near the apex, mainly on account of the more numerous russet dots; ground color rich yellow, almost covered with dull pink shading to deep rich crimson, showing a few indistinct streaks; flesh yellowish, rather firm, crisp, juicy, fine-grained; flavor rich aromatic subacid; quality excellent for dessert.

Red Canada has a comparatively late blooming period, May 5 to 10. The fruit is ready for picking the third week of October. The maximum quality is developed in December or January, and in a good cellar which is not too dry, the quality is retained until late

[1] *Apples of New York*, I, 276.

winter, and the greater part of the apples will remain in edible condition until April. A tendency to shrivel in storage is the only serious fault of the fruit, and is very difficult to overcome. Storage in a pit out of doors is perhaps the only way by which the shriveling can be prevented.

For some culinary uses Red Canada is perhaps a little too fine-grained, the cooked fruit becoming somewhat pasty. This is most noticeable in the baked apple. The flavor is good to excellent with any method of preparation. As a dessert apple, it is excellent for several months after maturity, and is one of the few long-season varieties of high quality, ranking with Stayman, Grimes, Jonathan and Oliver Red in this respect.

Red Canada seems best adapted to the northern half of Ohio. Favorable reports have been received from several points, especially from growers in Summit County. Several letters sent out with questions concerning the Red Canada as grown in various sections of Ohio brought out the following points:

Red Canada is considered a standard commercial variety, almost equal to Baldwin. In quality it is equal to Grimes, Northern Spy or Baldwin. It is best adapted to a location over a gravelly subsoil.

It does not require as much thinning as Baldwin because the fruit does not grow in clusters. Top-working is desirable for Red Canada in order to secure vigorous, hardy stocks. As many as 12 barrels of fruit have been produced by a tree in a single crop. Excessive fruit production should be prevented by thinning or pruning to avoid the formation of a biennial habit of bearing.[1]

Good color, annual crops, excellent dessert quality and a long season of usefulness recommend this variety for more extended planting in northern Ohio.

RED JUNE

Red June is a brilliantly colored summer apple of considerable promise, not well known in Ohio, but more common in the southern states and westward to the Ozark region. Its origin is in North Carolina.

The tree is of extremely upright growth and is inclined to become very bushy, with many slender branches and twigs. The heading back necessary to secure a more spreading growth usually removes the first fruit buds, which are most often produced at the terminals of the twigs in the top of the tree. Low heading is highly desirable with this variety.

[1]Letters from M. H Heighton, Kent, C O Hale, Ira, and Bert M. Hart, Peninsula, March 5, 1915.

The fruit is often borne in clusters, and five to seven fruits from one cluster of bloom is not uncommon. Uniformity in size, color and season of ripening may be secured by thinning, which may be done as soon as the apples are half an inch in diameter, as the variety is not affected by the "June drop." It is not early in coming into bearing, though a few apples are produced at 6 or 7 years from planting.

The apples are sometimes of good size, more often medium or small, roundish or ovate in form, with long, slender stems. Skin is smooth, glossy, rather tender, with heavy, whitish bloom; undercolor yellowish green, nearly covered with bright crimson, shading to dark carmine in highly colored specimens; flesh white, at first rather firm and crisp, but becoming very dry and mealy after maturity; flavor mild subacid; quality very good.

The period of bloom in the Station orchard is May 3 to 9. The fruit ripens on the tree over a rather long period, beginning about the third week of July and extending to the first or second week of August.

As a culinary apple Red June is exceptionally good, especially for pie. As a dessert apple it is much milder in acidity than Yellow Transparent, but has a little more aroma. The attractive color is in its favor as a commercial variety, though it is rather tender for shipping long distances and loses flavor and quality quickly after maturity.

Red June is perhaps best adapted for home use and the local market, and can be recommended for trial in all parts of Ohio.

RHODE ISLAND (GREENING)

This is one of the oldest as well as one of the most important varieties of the eastern apple-growing districts. Its range of distribution and adaptability is almost as great as that of Baldwin. In Ohio it is most successful in the counties bordering on Lake Erie. If taken as far south as Wayne County, it ripens too early to keep as a winter apple, and is not desirable as a late fall variety on account of the rapid loss of quality after the early maturity. Old trees have been observed which in a year of heavy crop production have borne medium-sized or rather small fruit, which kept in good condition until midwinter. From young trees or in light crops the apples are large, overgrown, soft and of poor keeping quality.

When well grown, Rhode Island is one of the very best culinary apples. The color of the cooked fruit is golden brown, and the

texture is fine and tender. The rich subacid flavor is largely retained in cooking. As a dessert fruit it is a little sharp in acidity, for most persons, until well past its maturity.

The trees growing in the Station orchard have been severely attacked by blossom and twig blight for a number of years. Though rather heavily pruned on account of the blight, they are large, spreading trees, but have borne only light crops during the last 5 years. The fruit is usually large, and often affected by a breaking down of the tissues similar to the Baldwin spot. The apples are very poor keepers in either cellar or cold storage.

Rhode Island is probably not to be considered as a commercial winter apple in Ohio outside of the northern tier of counties; and, as a late fall variety elsewhere in the State, it cannot compete with varieties better adapted to the climate and growing season.

ROME BEAUTY

In commercial importance as a southern-Ohio apple, Rome Beauty can be compared favorably with Baldwin as a northern-Ohio variety. In the counties bordering on the Ohio River, and in many orchards throughout the southern half of the State, Rome Beauty is the one variety of foremost importance. It originated with H. N. Gillett, in Lawrence County, Ohio, and was brought to the notice of the Ohio Convention of Fruit Growers in 1848.[1] The original tree stood on the bank of the Ohio River until about 1860, when it was undermined and washed away by high water.

The history of the original tree is interesting. Joel Gillett brought a number of apple trees from Putnam's nursery, at Marietta, Ohio, in the fall of 1816 to a farm 2 miles above Proctorville. While preparing to plant the trees the following spring, one was found which sprouted from below the point of grafting. This was given to the son, Alanson, who set it out in a corner of a field near the Ohio River. When fruit bearing began it was found to produce such fine apples that it was named Rome Beauty—Rome from the name of the township, and Beauty because of its fine appearance. H. N. Gillett was largely instrumental in promoting the propagation of the new variety.[2]

The tree is of vigorous growth, with main branches upright-divergent and laterals often spreading or drooping. Older bark is smooth, light olive-brown or yellowish. Twigs are slender, reddish brown; leaves of medium size.

[1] *Apples of New York*, I, 291.
[2] Letter from U. T Cox, Proctorville, Ohio, March 16, 1915.

Apple scab is the most serious disease of this variety, attacking both leaves and fruit. In some cases it becomes so severe that the stems of the newly formed apples are attacked soon after the blooming period, causing the fruit to drop while yet small, resulting often in the total loss of the crop. The proper spray materials thoroughly applied at the right time have been sufficient to control this disease, except in a few unusual cases of severe infections of the previous year which were not overcome by the regular spraying, or under weather conditions which reduced the efficiency of the sprays. A slight susceptibility to blossom and twig blight sometimes results in the reduction of the setting of fruit to a harmful extent.

Rome Beauty produces nearly annual crops, and with favorable conditions can be depended upon for a profitable crop every year after fruit bearing has become established, which is usually at 8 to 10 years from planting. Mature trees of this variety have furnished some interesting records of fruit bearing. The trees in the Station orchard have not been exceptionally fruitful, but during the last 6-year period have made an average yearly crop of 13.7 bushels per tree.

What is perhaps the largest yield ever recorded for an acre of orchard of 40 trees, at 22 or 23 years from planting, was reported by F. H. Ballou in connection with demonstration work for the Department of Horticulture of this Station.[1] This was in the Rome Beauty orchard of I. T. Lewis, at Porterfield, Washington County, Ohio, and constituted the second crop produced after the orchard had been reclaimed from unproductiveness by spraying. These 40 trees produced, after the removal by thinning of an average of 2,000 apples per tree, a total crop of 1,429½ bushels.

The fruit is usually large, with a high percentage of first-size apples; form roundish, inclined to conical, with a rather broad, flattened base; stem long, slender, not very securely attached to the apple, and requires special care in picking to prevent the loss of the stem; skin thick and tough, smooth and fairly glossy, with some gray scarfskin over the base; ground color yellow, mottled and streaked with bright crimson, often shading to solid carmine on the exposed side. The coloring varies much with the location, the best-colored fruit being produced in orchards located on elevated land, while "river-bottom" fruit is often very deficient in color. Several distinct types of coloring have been found and propagated, as "Dark Red" and "Bright Red" Rome Beauty. Flesh is nearly white, a little coarse, firm and crisp until mature, moderately juicy,

[1]Ohio Agr Exp Sta Bul 240

becoming dry and mealy when overmature; flavor mild subacid, with a mild aroma, which is rather insipid when the fruit has become mealy, usually richer in highly colored fruits; quality good.

Rome Beauty is in the late-blooming class. Records made in the Station orchard gives the average dates as May 5 to 10. The fruit is ready for picking the third week of October. It is very firm at picking time and bears handling exceptionally well, adapting it to all methods of marketing from bulk shipment to packing in the small carton.

Maximum quality is developed in common storage in January or February, and the fruit soon becomes mealy with a decided loss of flavor. The culinary quality is retained much longer than dessert quality, and the fruit seems better for cooking at 6 or 8 weeks after maturity than earlier in the season. The cooked fruit is light colored, of fine texture and of good flavor.

In cold storage Rome Beauty matures in July or August, but the slow ripening does not develop nearly as good quality as the more rapid process in cellar storage.

Apples have been kept in good condition, except a slight scalding and poor flavor, until the second January after the year in which they were grown. A tendency to scald in storage is perhaps the only weakness of the fruit, and is most serious on poorly colored apples.

Rome Beauty succeeds to a profitable degree in nearly all parts of Ohio. The best color and quality are developed on the elevated locations in the southern and southeastern counties of the State. The highest yields of fruit are produced on the more fertile soil of the river bottoms. Except in unusually favorable locations, growers in the northern counties of Ohio cannot expect to produce more than a medium color in the fruit, though good yields may be obtained.

Rome Beauty seems likely to retain its position as the foremost commercial apple of southern Ohio by virtue of its points of excellence, which may be summarized as follows: It is adapted to various soils and locations, and is productive often to an undesirable degree. It is adapted to various methods of packing and shipping, and presents an attractive appearance when displayed for sale. Its production in large quantities within reach of good shipping points attracts the purchaser who is seeking large quantities of one variety. The name is well known and reputation well established in the markets within reach of the districts to which Rome Beauty is well adapted.

ROXBURY

Roxbury is one of the old favorite Russets, which are reminders of the time when apples were stored in pits or caves out of doors. Then, as now, the common earth-floored farm cellar was a better place for the storage of apples than the modern cement-floored, furnace-heated basement, where Russet apples soon become "leathery" and are not to be compared with the crisp and juicy "rustycoats" brought forth when the pit or cave was opened in late winter or early spring.

Roxbury is one of the oldest of American varieties. It is generally supposed that this variety originated in Roxbury, Mass., early in the seventeenth century.[1] Soon after 1649 it was taken to Connecticut, and in 1796 was brought to the vicinity of Marietta, Ohio, and became an important commercial variety in that section of the State.

It is interesting to note in this connection that the Putnam nursery was the first one to be established within the borders of Ohio. The sons of Gen. Israel Putnam, of Connecticut, established this nursery in 1794 near the new settlement of Marietta. Scions of Roxbury were brought from the Putnam orchard, in Pomfret, Conn., and were grafted and later distributed under the name of Putnam Russet.[2]

The tree is moderately vigorous, with spreading to horizontal, open habit of growth. It is usually healthy and long-lived, producing biennial crops. The fruit seems little more subject to the attacks of codling moth than most other winter apples.

The fruit is of medium size, oblate, often elliptical in cross section; stem short; skin thin, moderately tough, dry and harsh, dull yellow, more or less covered with brown russet, sometimes showing a faint bronze blush; flesh pale greenish-yellow, firm, crisp and juicy if properly matured in an atmosphere sufficiently moist to prevent shriveling; flavor rich subacid, aromatic—a very good apple for all purposes when mature; season late winter and spring if storage conditions are favorable; period of bloom May 4 to 10; picking season the third week of October.

The use of cold storage in lengthening the season of the better varieties of smooth red and yellow apples, has aided in lessening the popularity of the long-keeping Russet varieties. However, growers who have trees of Roxbury will be well repaid for making a special

[1] *Apples of New York*, I, 293
[2] Wm A. Taylor, U. S Dept of Agriculture, Division of Pomology, Bul 7.

effort to store the fruit in such a manner that the best quality may be developed, and there is usually a good demand for these varieties when they are on the market.

SALOME

Salome is an apple of Illinois origin, probably adapted to all parts of Ohio, but having a rather inferior quality and suffering a large percentage of loss in storage.

The tree is quite productive, and nearly annual crops are produced. Pruning must be done regularly because of the bushy habit of growth, which does not favor the coloring of the fruit.

The fruit is of medium size, roundish, inclined to conical or ovate; skin thick, tough, rather dry and harsh, often marked with minute cracks and some russeting, which favors the extreme shriveling and early decay so noticeable with this variety in cellar storage; color yellow, splashed and streaked with pink and dull crimson; flesh yellowish, rather firm, crisp, moderately juicy, becoming granular with maturity; flavor sprightly subacid; quality fair to good; season early winter in cellar storage.

It is inferior to many other varieties of the same season, both for culinary and dessert uses, and is so often poorly colored that it cannot compete with Jonathan, Sutton, Hubbardston and like varieties.

SANDBROOK

This is a sprightly flavored little summer apple of unknown origin, and of little practical value except as an addition to the amateur fruit-gardener's collection.

Good crops have been produced, but the relatively small size of both tree and fruit makes the yield in bushels seem rather low. The quality of this apple is excellent, but the fruit is small, often little larger than a good-sized crab apple, seldom reaching 2½ inches in diameter.

SAN JACINTO

This brilliantly colored summer apple of the Red June type came to notice in the orchard of Dr. A. M. Ragland, of Pilot Point, Denton County, Texas, among trees purchased from a Georgia nursery under the name of Mrs. Bryan. Finding the variety entirely distinct from the Mrs. Bryan, and being impressed with its merits, Dr. Ragland named the variety San Jacinto. It has been propagated by the Munson nurseries, Denison, Texas and listed in their catalog under this name since 1903.[1]

[1]W. A. Taylor, *Promising New Fruits*, Yearbook, U. S Dept of Agriculture (1911), p. 425.

The tree is more vigorous than Red June in habit of growth, and the fruit is much larger. The apples are almost the duplicates of Red June except in size. The roundish-ovate form, bright crimson and carmine coloring, tender white flesh and mild acidity, with the tendency to become dry and mealy after maturity, are characters found constantly in the fruit of both varieties.

The season of San Jacinto is about 2 or 3 weeks later than that of Red June, and is of the same length. The fruit can be used during a period of nearly a month, beginning the last week of August. It is excellent for most culinary uses, but perhaps a little too juicy for baking. When just mature it is a very pleasing dessert fruit, but becomes insipid when the dry and mealy stage is reached.

In the Station orchard the first fruit was produced by trees at 6 years from planting, and the yield has gradually increased to an average of 5.6 bushels per tree in 1915, the tenth year from planting. The apples were unusually good with few second-grade fruits.

Further trial is necessary to establish the merits of this variety under Ohio conditions, but indications are extremely favorable in the points so far observed.

SHIAWASSEE

This variety, of Michigan origin, is considered to be a seedling of the Fameuse. The original tree bore its first fruit more than 60 years ago in the orchard of Beebe Truesdell, in Vernon, Shiawassee County. It has not gained much recognition in Ohio, and is probably no better adapted to conditions here than is the Fameuse.

The tree is of moderate growth, with divergent, rather slender branches; older bark smooth and yellowish brown. Twigs are slender, dull reddish-brown; leaves medium to small. A susceptibility to twig blight is the only weakness of the tree appearing so far. Heavy crops have been produced by trees in the Station orchard at 9 and 11 years from planting.

The fruit is medium to large, oblate, with long, slender stem; skin rather thin and tender, smooth, somewhat glossy, with a thin bloom; undercolor pale yellow, shaded with bright crimson and streaks of carmine; flesh white, veined and shaded with pink, very tender and fine-grained, moderately juicy, becoming mealy when overmature; flavor subacid with the aroma of the Fameuse; quality very good.

Period of bloom in the Station orchard is May 3 to 8. The fruit is ready for picking about the first week of October, but if not picked will hang on the tree for a month longer, becoming very soft

and mealy. The apples are sometimes affected by a fruit spot similar to that found in Baldwin. In storage it has about the same length of season as Fameuse (October to December) with less tendency to shrivel and decay.

Shiawassee will doubtless succeed in any section where Fameuse can be grown, and, since it averages somewhat larger in size and is a little richer in flavor, it is perhaps more desirable than the Fameuse. Where an apple of this type is desired, Shiawassee can be recommended for a limited trial in northern Ohio. Home use and local market are probably the extent of its usefulness.

SIMMONS RED

This variety originated in Georgia. The fruit ripens in the Station orchard the third or fourth week of September. The first apples were produced by the trees during the seventh year from planting.

The tree is of vigorous, upright growth; fruit medium to large, oblate-conic; ground color greenish yellow, nearly or quite covered with dark crimson, showing indistinct purplish streaks; flesh creamy yellow, rather firm, moderately juicy, tender when mature; flavor mild subacid, with very pleasing aroma; quality good.

Further trial and observation are required with this variety to determine its adaptability to Ohio conditions.

SMITH CIDER

This is a common variety in southern and southeastern Ohio, where it develops much better color and quality than in the Station orchard in Wayne County. As grown here, it is almost worthless. The tree is very susceptible to blight in all its forms; and, though it is productive of fairly good crops, the fruit does not mature well and does not improve in storage. For culinary use in sauce or pies it is of fair to good quality.

The wide, very shallow, peculiarly wrinkled basin and the shading and mottling of bright pink over greenish yellow in well-colored specimens serve to distinguish this variety from nearly all others.

As grown in southern Ohio, the fruit is subject to two serious diseases: black rot and apple blotch. These diseases have not appeared on Smith Cider in the Station orchard.

In competition with a number of better varieties as well adapted to southern Ohio as Smith Cider, it is not to be recommended for further planting.

STARK

This winter apple originated during the early part of the nineteenth century in Delaware County, Ohio. The original tree was planted by John Main on his farm near Delaware. The variety was brought to notice by H. P. McMaster, of Leonardsburg, in the same county.[1]

Stark is adapted to the same section as Baldwin, and its range of adaptation in Ohio extends considerably farther south. It ripens a little too early in the southern counties for a good winter apple. As growing in the Station orchard, the tree is very thrifty and vigorous, as large as that of Baldwin or Northern Spy. A serious susceptibility to blight is a weakness which greatly reduces the value of the variety, all forms of the disease appearing on the tree. The succulent early growth seems especially favorable for the rapid spread of the disease. The fruit is often attacked by the apple blotch.

Crop production has been somewhat variable, but the best trees have borne alternate heavy and medium or light crops annually.

The fruit is medium to large, roundish, inclined to conical; skin moderately thick and tough, somewhat harsh and dry; color greenish, becoming clear yellow when mature, faintly striped with pink, sometimes becoming a dull brownish-red with purple stripes; flesh creamy white, firm until mature, juicy, becoming tender and often granular after maturity; flavor mild subacid, with mild pleasant aroma; quality good; season midwinter or later.

Period of bloom is May 4 to 9. The fruit is ready for picking the third week of October. It matures in cellar storage in January or February, and under good conditions will keep until early spring. In cold storage the apples do not mature properly, and must be removed for a short period of ripening if the best quality is desired. A few specimens from the 1912 crop were kept in cold storage until they were exhibited at the Ohio State Fair, August 31 to September 4, 1914.

As a dessert apple Stark is very good when properly matured. Except for baking, it is unsatisfactory for culinary uses.

The apples are inclined to be very poorly colored from the lower and inner branches of the tree, though the color improves when maturity is reached and the undercolor becomes yellow.

Stark is well known in Ohio, and has gained some recognition among commercial growers as a standard winter apple. However, in competition with Baldwin, Grimes, Rome Beauty or Stayman, it

[1]A. H. Gaston, *Western Pomologist* (1872).

cannot be recommended for commercial planting in the sections of Ohio where the better varieties succeed. For home use as a late-keeping winter dessert apple it is desirable for the northern and central parts of the State.

STAYMAN WINESAP

Among the many seedlings of Winesap which have been introduced to cultivation during the last half-century, Stayman Winesap is the most widely adapted, and of the highest quality. The first published description of the variety appeared in Charles Downing's Third Appendix to the second edition of "Fruits and Fruit Trees of America," published in 1881.

The original seedlings from which the Stayman Winesap was later selected were grown by Dr. J. Stayman, at Leavenworth, Kan., in 1866, from seed taken from a choice lot of Winesap apples grown in the same county. The first fruit of this variety was produced in 1875, but aside from the descriptions by Dr. Stayman, one of which was quoted by Downing as previously mentioned, no special attention was attracted to Stayman Winesap until after 1890, when its good qualities were discovered almost simultaneously by R. J. Black, of Bremen, Ohio, and J. W. Kerr, of Denton, Md., both of whom fruited it on top-grafts about that time. It was first cataloged by the latter in 1894-1895.[1]

Since then it has been disseminated throughout the section from New Jersey and Virginia to Kansas, Nebraska and the Ozark region, as well as to the fruit districts of the Rocky Mountains and of the Pacific Coast. An adaptation to all the sections in which Winesap succeeds, with an extension into more northern latitudes not reached by Winesap, is indicated by reports from many points concerning this variety.

The tree resembles Winesap in habit of growth, but is much more vigorous. The main branches are stout, unright-divergent, with spreading laterals, making a somewhat open top, and not difficult to prune. The older bark is dark gray. Twigs are stout, red-brown to maroon; leaves medium to large. The habit of growing strong leaders must be corrected by regular heading back to prevent the tree from becoming ill-shaped.

In common with other members of the Winesap group this variety is susceptible to apple scab to a marked degree. Thorough spraying with the common fungicides (lime-sulphur or Bordeaux mixture) has been efficient in controlling the disease on Stayman Winesap in the Station orchard. A tendency to sunscald has been

[1]W. A. Taylor, *Promising New Fruits*, Yearbook, U. S Dept of Agriculture (1902), p. 470.

noted on young trees planted on a western slope, the trunks of which had become exposed to the sun on account of the tops being inclined away from the prevailing wind. Only one tree has been observed to be seriously affected by blight, this tree being a replant among larger trees, some of which were badly blighted.

Young trees of Stayman Winesap produced the first crop of fruit at 8 years from planting, and have since borne annual crops. The oldest tree, now 22 years from planting, has produced a total of 79.7 bushels during the last 6-year period, including alternate heavy and light crops. The full crops require thorough thinning, the size and coloring being greatly improved. In the northern half of Ohio this variety is inclined to be rather deficient in color, and almost every means of increasing the coloring is an advantage. It is necessary, however, to make one exception. The fruit cannot safely be allowed to hang on the tree until the maximum color has developed on account of the tendency to water-core.

The fruit is medium to large if properly grown, sometimes very large in light crops; form roundish-conical; stem medium to short, slender; cavity of medium size, russeted, sometimes with russet extending over the base of the apple; calyx rather large, closed; basin narrow, of medium depth, sometimes furrowed; skin thin and tough, usually smooth, but often somewhat dull on account of the heavy, grayish scarfskin; undercolor greenish yellow, faintly mottled and streaked with dull crimson, shading in well-colored specimens to solid deep-crimson; core rather small, partly open or closed; flesh yellow with greenish tinge, rather firm at first, becoming fine-grained, very tender and juicy when mature; flavor mild, vinous, aromatic subacid; quality excellent for dessert and good for culinary uses.

Period of bloom in the Station orchard is May 4 to 10. The fruit is ready for picking the third or fourth week of October. In an ordinary cellar the maximum quality is developed in December or January, but good flavor and quality are retained for a long period after maturity. Under favorable conditions the apples have been kept in cellar storage until May 1 with 84 percent of the apples sound, except for being somewhat shriveled. In cold storage the period of maturity was extended to April or May, and 80 percent were in good condition at the conclusion of the test, August 24. Some shriveling is noticeable also in cold storage. When properly handled and stored, Stayman Winesap may be depended upon to provide apples for dessert purposes in good condition from December to April or May.

As a culinary apple it is not as good as when used uncooked. The pieces largely retain their form, and the acidity is a little too mild for a good flavor to be retained after cooking.

Favorable reports have been received from various sections of Ohio regarding the Stayman Winesap, and the relative deficiency in coloring in northern Ohio does not seem to affect its popularity in that section. The best results are perhaps to be expected from the variety in the central and southern parts of the State. As a highly desirable apple for dessert purposes during the larger part of winter and early spring, with a vigorous healthy tree, producing good crops, this variety can be recommended for planting in practically every part of the State. The only reservation to be made is the possibility of its being rather small and poorly colored in the northern counties because of the shorter season.

SUMMER KING

Originating in North Carolina, Summer King was brought to Warren County, Ky., by early settlers about 1810 or 1815, where it became a relatively prominent variety during the middle of the last century. It has also been grown to a limited extent in other sections, but the variety is unknown to most fruit growers.[1]

The tree as growing in the Station orchard is of rather slow growth. Branches are stout, divergent, with many laterals and twigs, making a bushy top. Older bark is brownish gray, shedding from the trunk in rather long and narrow flakes. Twigs are rather slender, brown; leaves medium to small. The tree is exceedingly susceptible to attacks of blight in all forms, and the setting of fruit is often much reduced by the blighting of the blossoms.

Heavy biennial crops are produced and usually require thinning to secure fair size and color of the fruit. The short stem favors the early crowding of clusters, and if not thinned some of the fruit is forced to fall from the tree while still quite immature.

The fruit is medium in size, sometimes large in light crops; form oblate, with a broad, flat base; stem very short, rather stout; skin moderately thick and tough, smooth; undercolor bright green shaded with dull crimson, showing some streaks and splashes, and shading to deep carmine on the exposed side; core of medium size, closed; flesh white, tender, juicy; flavor sprightly subacid, with mild aroma; quality good.

The period of bloom is May 6 to 11. The fruit ripens on the tree in the second and third weeks of August. Though not of high quality for either dessert or culinary uses, it occupies the

[1] *Promising New Fruits*, Yearbook, U S Dept of Agriculture (1912), p. 266.

season between Oldenburg and Late Strawberry, otherwise not well suplied with good apples; and, in locations where blight is not so prevalent as in the Station orchard, this variety may prove quite desirable. If properly grown the fruit is of good size and color, and endures handling better than many other summer apples. The variety can be recommended for more extended trial throughout the State.

SUMMER RAMBO

Considerable confusion exists regarding the nomenclature of the Rambos. A number of varieties are plainly in the Rambo group, among which the variety usually known as Rambo, an early winter apple previously described, is taken as the true type. The Summer Rambo, while much larger and nearly a month earlier in season, has practically the same coloring, texture and flavor as the late variety. Grosh and Western Beauty, considered by some to be synonyms,[1] cannot be distinguished from Summer Rambo as grown in the Station orchard. It is possible that the long season of ripening of Summer Rambo, with its tendency to ripen and fall very early, if the fruit has suffered from insect or mechanical injury during the growing season, may be responsible for the difference in season between Grosh and Summer Rambo as recorded by some authorities. The variety is said to have originated in France and has long been known in America, having been described early in the nineteenth century. It is well known in Ohio.[1]

The tree is more vigorous, and of more open and spreading growth than the Rambo, requiring but little pruning aside from heading back the leading shoots to make the tree more compact. The habit of fruiting on spurs prevails also in this variety. Older bark is olive gray. Twigs are stout, reddish brown; leaves medium to very large. The tree is practically free from disease. The bearing habits are somewhat irregular, but moderate annual crops of large apples are usually produced. The fruit is well distributed through the tree and is seldom found in clusters, requiring little or no thinning. A light fall of hail during a storm in the summer of 1914 injured nearly every apple on a young tree of this variety, causing more or less premature ripening, depending on the severity of the injury.

The fruit is large, oblate; stem usually long and slender; skin somewhat dry and harsh, moderately thick and tough, with a whitish bloom; color greenish yellow, shaded with dull pink, streaked with bright to deep crimson, often more highly colored

[1] *Apples of New York*, II, 89.

than the winter Rambo; core small, closed; flesh white, very juicy, crisp, slightly granular, a little coarse until fully mature; flavor mild subacid, with distinct "Rambo" aroma; quality excellent.

Period of bloom in the Station orchard extends from May 4 to 10. The fruit ripens during a long season, extending from the last of August until nearly a month later.

For dessert purposes Summer Rambo is as good as the later Rambo, but is perhaps a little more acid, which seems also more noticeable in the cooked fruit. It has a good quality for all culinary uses.

Good size and quality of fruit, a long season of ripening, the "Rambo" flavor and a vigorous, healthy tree should recommend the Summer Rambo for general planting in the home orchard and for local market in all parts of Ohio.

SUMMER ROSE

This is an excellent summer dessert apple of New Jersey origin. It has a long season of ripening and can be used for culinary purposes by the middle of July. It ripens on the tree the last week of July.

The tree is of rather slow growth, making a compact, round top. The root system seems somewhat weak. The fruit is small to medium, roundish-oblate, with short stem; color pale greenish-yellow, shaded and streaked with pink and bright crimson; skin very thin and tender, and inclined to crack open as the fruit matures; flesh white, moderately juicy, becoming granular when overmature; flavor mild subacid, aromatic; quality very good.

The variety is perhaps better adapted to the amateur's fruit garden than elsewhere, but its excellent dessert quality, early fruit production and attractive coloring might give it a place in the home and local-market orchard to supply a fancy trade in dessert fruit.

SUTTON

The name of this variety is taken from the town of Sutton, Mass., in which it originated. It is supposed to be a seedling of Hubbardston, which it much resembles, especially in the fruit. It was brought to notice through the Worcester County Horticultural Society in 1848.[1]

The tree resembles that of Hubbardston only while young, as the latter becomes more bushy and the twigs more slender and often drooping with age and fruit bearing, while Sutton preserves an upright growth, with the fruit produced on short spurs along the

[1] *Apples of New York*, I, 325.

entire length of the long, slender branches. The very upright growth resembles that of certain pear trees, and the stout, vigorous leader at the end of each branch often grows rapidly at the expense of the side branches. Low heading and systematic pruning are necessary with this variety to induce the formation of even a moderately low, spreading top when the bearing age is reached.

Under favorable conditions the first fruit is produced at 6 or 8 years from planting. Biennial crops seem to be the rule, but with systematic thinning alternate heavy and light crops are possible. This has become the habit of some top-grafted trees of Sutton in the Station orchard.

An extreme susceptibility to blight in all its forms is making this variety of doubtful value for locations where blight is prevalent. The production of blossoms on spurs on the main branches makes the disease all the more serious because of blossom infection leading it into the larger branches, which are often quickly encircled by cankers.

Sutton is said to be seriously affected by apple scab in some localities, but this has not been the case in the Station orchard.

The fruit is medium to large, roundish, inclined to conical; stem short, rather slender; skin rather thin and tender, smooth; undercolor greenish yellow, blushed and mottled with dull crimson, showing indistinct stripes. Highly colored specimens are sometimes nearly covered with crimson. The core is rather small, closed; flesh white, tinged with yellow, tender, crisp, juicy, becoming very soft and somewhat mealy when overmature; quality very good for all purposes when properly matured.

Period of bloom in the Station orchard is May 3 to 9. The fruit is ready for picking the second or third week of October. It matures in cellar storage in November or December, and loses quality rapidly afterward, seldom keeping in good condition after February.

In cold storage Sutton matures in April and keeps fairly well to the end of May. A tendency to shrivel is noted, in both cellar and cold storage tests.

Sutton cannot be handled safely in bulk or barrels on account of the tender skin and flesh. It is well adapted to box packing or baskets, and has been shipped successfully from this Station in the small mailing cartons.

Its attractive coloring when well grown, the uniform shape and size and the good quality in early winter should make Sutton desirable as a fancy apple for the Holiday season, and with cold storage

the variety would be available during the entire winter. The upright growth of the tree would permit the use of Sutton as fillers, or in closer planting as permanent trees. The trees are, however, rather tardy in beginning to bear.

The variety seems well worthy of more extensive planting, especially in the northwestern part of the State.

TERRY

As growing in the Station orchard, this is a good example of the planting of a variety of apples in regions to which it is not well adapted. Terry originated in Fulton County, Ga., where the varieties that mature sufficiently late in the season to become winter apples are very few in number. Of these, Terry, Yates and Shockley are represented in the Station orchard.

Terry in Ohio is extremely late in ripening, and develops only a fair coloring of dull purplish-crimson on the tree, maturing in cellar storage in late winter or early spring.

The tree bears good crops at an early age, and is nearly an annual bearer. The fruit is entirely too small for any purpose except cider, and is of inferior quality largely because of the relatively short season as compared with conditions in Georgia, to which this variety is well adapted.

Except as a very productive, very late-keeping apple of small size and fair quality, Terry is of no special interest to Ohio growers.

A full description is given by W. A. Taylor in the Yearbook of the U. S. Department of Agriculture, for 1903, in "Promising New Fruits," page 270.

TETOFSKY

This is one of the Russian varieties imported from England by the Massachusetts Horticultural Society in 1835. Its superior hardiness has given it a wide dissemination in the regions where the climate is too severe for most varieties of apples.

In Ohio it is in competition with Yellow Transparent of the same season and of a larger size and better quality. It has been strictly biennial in bearing habits, and in the bearing year is usually overloaded.

The tree is of slow, upright growth, with numerous fruit spurs distributed along the entire length of the branches. The fruit is small, oblate or roundish-conic, pale yellow streaked with pink and crimson; flesh greenish white, tender, juicy; flavor subacid, with pleasant aroma; quality good. Fruit ripens during the third and

fourth weeks of July. It loses quality very quickly after picking. This variety is not desirable where Yellow Transparent can be grown successfully.

TOLMAN

Tolman is a well-known, yellow, winter, sweet apple, esteemed by many as a culinary variety.

As grown in the Station orchard, its extreme susceptibility to blight, especially of the blossoms and twigs, makes it one of the least desirable of the varieties grown here. But very few apples have been produced by the trees because of the destruction of the blossoms by blight. This is not common with the variety as a rule, and it is possible that the conditions favoring a rapid, succulent growth, especially on strong-growing varieties like Tolman, are such as to furnish the blight with the best conditions for its rapid spread.

The tree is vigorous, spreading, large, with stout branches. The fruit is of medium size, roundish, with a rather harsh, rough skin; color rich yellow; flesh white, very firm, somewhat tough and coarse; flavor very sweet; season early winter.

This variety is not desirable where Winter Paradise can be successfully grown.

TOMPKINS KING

This is another of the varieties which, with Rhode Island and Northern Spy, are evidently beyond their southern limit of adaptability as grown in the Station orchard.

The tree is very vigorous, with long, stout branches. It is much inclined to make an interlacing growth with many crossing and interfering branches. Blight and collar rot are serious diseases with this variety. Moderate annual crops are produced. The average yearly crops from the trees in the Station orchard have been 8.1 bushels per tree for the last 6-year period.

The fruit is large to very large, roundish-oblate, usually with a long, slender stem; skin thin and rather tough; undercolor rich yellow, mottled and streaked with light to dark crimson shading to deep carmine; flesh yellowish, moderately firm, juicy, crisp, tender and fine-grained; flavor mild subacid, aromatic; quality very good; season early winter.

The period of bloom is rather early, May 2 to 8. The fruit is ready for picking the last week of September, and is inclined to water-core if left on the trees too long. It matures in November in cellar storage, and loses quality rapidly after maturity. In cold storage it keeps fairly well until midwinter.

Although of fine color, large size and good dessert and culinary quality and usually commanding good prices in the markets, Tompkins King is considered by most Ohio growers as an unprofitable variety. This is largely due to the rather light crop production, and to the susceptibility to insect injury, which increases the percentage of second-grade fruit.

The variety is better adapted to northern Ohio than to the central or southern parts of the State, where it is practically a fall apple and is in competition with a number of other varieties of greater productiveness.

TWENTY OUNCE

Among the varieties in the Station orchard that are seriously susceptible to blight infection, Twenty Ounce has fared as badly as Tolman, Keswick and Colton, which have seldom produced even a fair crop because of blossom and twig blight.

The tree is somewhat bushy and dense, with slender, drooping twigs. The blossom clusters are mostly produced from terminal buds, and the fruit hangs pendant on the long twigs. The apples are often very large, but seldom approach the actual "20-ounce" size. Form is roundish; surface somewhat uneven; color greenish yellow, streaked and shaded with dull pink and crimson; flesh creamy white, somewhat coarse until mature, becoming more tender and often granular; flavor rather sharp subacid, aromatic; quality very good for culinary uses. The fruit ripens on the tree in early October and will keep in cellar storage through November, but often suffers considerable loss from decay.

A grower in northern Ohio finds this variety profitable in a local market for late fall.[1] He makes several pickings to secure more uniformity in size and coloring, and heavy crops are often produced by the trees.

A "bud sport" of Twenty Ounce originating at Hilton, Monroe County, N. Y., has been propagated under the name of Collamer or Collamer's Twenty Ounce. It is the same as Twenty Ounce in almost every point except color, which is in broad stripes of crimson becoming almost a solid color, and is much more attractive than the green and dull red of the older variety.[2]

WAGENER

Wagener is a well-known variety in the eastern apple-growing districts of the United States. The seed from which the original tree grew was planted in 1791 at Penn Yan, Yates County, N. Y.

[1]Letter from H W Schmitkons, Lorain, Ohio, Jan. 30, 1915.
[2]*Apples of New York*, II, 36.

In 1796 the land on which the seedling trees were growing was purchased by Abraham Wagener, from whom the name of the new variety was derived. The original tree was reported to have borne full crops until the year 1865.[1]

The tree is a vigorous grower when young; but, when fruit bearing has become established, which is quite early in the life of the tree, the growth is much retarded, and mature trees are about a third smaller than Baldwin trees under the same conditions. The fruit is produced on spurs, with which the branches are thickly set.

Heavy biennial or moderate annual crops are produced. The heavier settings of fruit are much improved by thinning. The fruit is inclined to be very deficient in coloring and often in flavor when the trees are overloaded.

The moderate growth and early fruit production make this variety a desirable one for use as a filler among trees of the standard commercial varieties. A susceptibility to blight is a serious weakness with the trees of Wagener in the Station orchard. It has a general reputation of being short-lived, and top-working upon more vigorous stock such as Northern Spy is advised.[1]

The fruit is medium to large, oblate, regularly ribbed or "five-sided"; skin smooth, thin and rather tough; undercolor pale yellow, washed and streaked with pink to bright crimson; flesh white with yellowish tinge, rather firm, crisp, juicy, fine-grained; flavor mild vinous subacid, with pleasing aroma; quality very good; season early winter.

Wagener is inclined to scald in storage, the poorly colored immature fruits showing the effects of the scald more than the well-colored fruits. Samples of thinned and unthinned Wageners packed direct from the orchard in a barrel, a bushel and a half of each, were opened December 26, and 100 apples from each sample examined. Of the unthinned sample 57 showed scald, and of the thinned sample 21, with none seriously scalded. These apples had been wrapped in newspapers before packing in the barrel, and were kept in cellar storage after shipping to Wooster. The apples from the thinned trees were more highly colored than those from the unthinned trees.

Wagener is a better keeper than Northern Spy, and does not shrivel in storage.

WALBRIDGE

This variety, originating in Illinois in 1818, has been somewhat extensively planted in Iowa and Wisconsin. The trees of this

[1] *Apples of New York*, I, 355.

variety in the Station orchard have been producing variable, nearly annual crops, of very good average yield. The tree is of moderately vigorous growth and free from disease.

The fruit is medium to small in full crops, oblate-conic, pale yellow streaked with bright pink; flesh firm, somewhat coarse, flavor subacid, with a peculiar aroma; quality fair; season midwinter. The apple is a poor keeper in storage, somewhat inclined to scald and decays very quickly after scald develops.

This apple is too low in quality to be considered either as a commercial variety or for home use, and hence cannot be recommended.

WEALTHY

This deservedly well-known and popular apple is the result of the careful and patient efforts of Peter M. Gideon, of Excelsior, Minn., in growing thousands of seedlings, among which appeared the original tree of Wealthy. There are now many seedlings of this variety, the growing of which was stimulated by the exceptional hardiness of Wealthy in the more rigorous climate of the northwestern states and the apple-growing provinces of Canada. In these more northern latitudes Wealthy is of late fall and early winter season, while in Ohio it becomes a fall apple.

It is superior in most respects to the other common varieties of this season for culinary purposes and as a dessert apple where the acid flavor is relished.

Wealthy has been widely disseminated, and is recorded[1] in the list of varieties published by the American Pomological Society as being highly successful in 12 of the 18 pomological districts, embracing all the apple-growing districts of Canada and the United States, except those of the extreme South and Southwest.

The tree makes a vigorous growth in the nursery, which continues until fruit bearing begins. The usual heavy crops check the growth to such an extent that the tree is often little more than half the size of a Baldwin or Northern Spy of the same age and under the same conditions. The growth is open, at first rather upright, but becoming divergent and even spreading with fruit bearing. The branches are rather slender and long, but bear the heavy loads of fruit remarkably well. The older bark is brownish; twigs are slender and dull maroon in color; leaves medium to large.

The inclination to grow long, slender branches should be corrected by a systematic heading back of the leaders to promote a stocky growth, which will bear the heavy crops more safely.

[1]U. S Dept of Agriculture, Bureau of Plant Industry, Bul. 151, p 21.

The only weakness which has appeared in this variety in the Station orchard has been a susceptibility to blight, which at times becomes very serious, especially when the disease attacks the blossoms of a full setting of bloom.

What many growers consider a weakness is the tendency to overbear and produce small fruit. This can be largely overcome by attention to the soil fertility and to a rigorous thinning of full crops, usually more than that required to prevent the branches from breaking.

The bearing habits of Wealthy are variable, but it has established a reputation for good crops at a very early age. A tree in the Station at 5 years from setting produced a bushel of fine apples after being thinned. An older tree bears heavy crops biennially, while accidental influences have caused other trees to bear crops on alternate parts every year.

The checking of growth, due to bearing at an early age, makes possible, when planting in full rows as permanent trees, the setting of Wealthy at distances of 5 or 10 feet less than for Baldwin or Northern Spy under the same conditions. This also makes the variety especially valuable for planting as a filler between permanent trees, which may be of varieties that mature more slowly. Such a practice insures earlier returns from the orchard.

Fruit is medium to large if properly grown; form roundish-oblate, regular, often unsymmetrical; skin thick, tough, smooth, glossy when polished, with slight bluish bloom and rather numerous white or yellow dots; ground color light greenish-yellow shaded with pink and crimson, streaked with carmine, highly colored specimens becoming dark red with purplish streaks. Seeds are large; core is closed, rather small; flesh nearly white with tinge of green, crisp, very juicy, somewhat tough and spongy until fully mature; flavor sprightly vinous subacid, with a pleasant aroma; quality very good to best. The fruit does not mature on the tree, and requires a short period of ripening after picking to attain its best quality, though some persons relish the rather sharp acid of this apple as it is picked from the tree. It is a very refreshing dessert fruit when mature. As a culinary apple it is very good for sauce and pie, though perhaps a little too juicy for baking, and requiring considerable sugar to disguise the acidity.

The period of bloom extends from May 4 to 10. A full setting of bloom often includes many imperfect blossoms, and the tree is inclined to show considerable "June drop," which, however, usually leaves the tree still overloaded.

The ripening period is very long, the first ripe windfalls coming the last of August, and the last ripe fruit is to be found on the trees the latter part of September. This indicates the necessity of several pickings, which in the case of Wealthy is certainly advisable, as the largest and best-colored apples can be removed, leaving the smaller ones to gain color and size.

While only an autumn variety in Ohio, it can be kept in cold storage for a long period, and will retain good quality until December or January. A few specimens have been kept until the following August still in condition to exhibit at the Ohio State Fair early in September.

There are few varieties which show an adaptability so wide and have gained a reputation so extensive as Wealthy. For Ohio it is without doubt the best variety of its season, as an acid culinary apple, for both home use and market. Hardiness of tree, productiveness, bearing at an early age and ready response to proper orchard practice recommend this variety for all sections of Ohio where an apple of its season and quality is desired.

WHINERY

This small, late-keeping winter apple originated on the farm of Joshua Whinery, near Winona, Columbiana County, Ohio.[1]

The tree is large, vigorous, very dense and bushy. Branches are divergent-spreading, stout, with slender laterals and twigs. Older bark is dark gray, with a tinge of yellow. Twigs are dull reddish-brown, with considerable scarfskin; leaves numerous, rather small. The tree is but little affected by disease. Alternate medium and heavy crops are produced annually, and thinning is necessary with every heavy crop if fair size and coloring are desired. Profitable crops are produced at 10 or 12 years from planting.

The fruit is medium to small, roundish-conic, with rather long stem; skin thin, rather tough; undercolor pale yellow, largely blushed with dull crimson, sometimes showing a bright patch of yellow where closely shaded by a leaf; flesh greenish white, firm, juicy, fine-grained; flavor mild subacid, with pleasing aroma; quality good; season late winter and spring.

As a culinary apple this variety is somewhat disappointing. Though the color and flavor of the cooked fruit are good, its texture is coarse and tough, and it has very little juice.

As a late-keeping dessert apple, it may be profitable if the heavy crops are thoroughly thinned to secure fair size. Although it keeps much later in the season, it is too small to compete with Baldwin in any market.

[1]Budd & Hansen, *Systematic Pomology*, II, 200.

WHITE PIPPIN

"Though this variety is widely distributed in many parts of the country, from Maine to the Pacific coast and as far south at least as northwestern Arkansas, it is not produced in important commercial quantities in any section. So far as the fruit indicates, it appears to be one of those 'strongly fixed' varieties which do not vary greatly in appearance even when grown under widely different conditions."[1]

In Ohio it is well known, but, on account of its late bearing habit and the tendency to produce small fruit when heavy bearing begins, it has not come into cultivation as a commercial variety. However, it has no more faults than Baldwin and is adapted to more southern latitudes. Its origin is unknown.

The tree is exceptionally vigorous and free from disease. Growth is upright, compact, with the leading twigs erect, requiring persistent heading back to form a low top. The young trees are inclined to make too many main branches, which often start so close together on the trunk that a poorly constructed tree results, favoring splitting down when heavy fruit production begins. The tendency to bushiness persists throughout the life of the tree. The branches are long and rather slender. Older bark is brownish gray. Twigs are brown, slender, with the strongest new growth in the top of the tree; leaves medium to large, of heavy texture, dark green.

The disease susceptibility of White Pippin is limited to an occasional blighted twig in the tree and a few spots of apple scab on the fruit, the latter being controlled by spraying.

When no thinning is done the trees develop a biennial habit of bearing, the extremely heavy crops alternating with very small crops or perhaps a few apples in the "off year." Such thinning as has been done on the three older trees in the Station orchard, now 21 years from planting, seems to have been sufficient to induce a habit of annual fruit bearing, but further observation will be necessary to determine whether the habit has become permanent.

In fruit production during the last 6-year period these trees rank with Grimes, Baldwin and Ben Davis, of which there are three trees each of the same age, all but Grimes being in the same or adjacent rows. An average yearly crop of 15.7 bushels has been produced by the White Pippin trees during the 6 years, including a record crop of 36.1 bushels after thinning for the largest tree in its nineteenth year. The young trees began to bear fruit at 10 or 12 years from planting, but heavy crops are unusual before the fifteenth year.

[1]U. S. Dept. of Agriculture, Bureau of Plant Industry Bul 275, p 52

The fruit is medium to large when well grown; form somewhat variable, oblate to truncate oblong, often oblique; skin smooth, somewhat glossy, thin and moderately tough; color light green becoming pale yellow when mature, sometimes showing a bright pink blush; flesh white, very hard at picking time, becoming fairly tender when mature, crisp, juicy, slightly granular; flavor subacid, with rich, pleasing aroma; quality very good; season late winter and spring.

The period of bloom is May 4 to 9. The apples are ready to pick the second or third week of October. The firmness of the fruit at picking time, with the advantage of the very short stem, makes bulk handling and barrel packing very successful with this variety. The maximum quality is developed in cellar storage in late winter, and under good conditions of temperature and ventilation will keep in good condition until May or June. In cold storage the mature stage is reached in July, and a few of the apples may be kept until the following winter.

Storage scald is the one serious trouble of White Pippin. As mentioned in the description of Greenville, an open crate, well ventilated, is the best container for apples subject to scald in storage. The factor or combination of factors responsible for the scald is yet to be determined.

For culinary purposes White Pippin is somewhat mild in flavor, but the cooked fruit has good texture and color. As a dessert fruit, it is relished by those who prefer a firm-fleshed "meaty" apple of good flavor and moderate juiciness. When stored under favorable conditions, it is one of the best of the long-keeping winter varieties.

Health and vigor of the tree, productiveness after the bearing habit has become established, late keeping and good quality recommend this variety for the home orchard in practically all parts of Ohio. As a commercial variety it should be profitable for a local market; and, if means of preventing the storage scald can be found, it may become a standard commercial variety for all purposes, possibly equal to the Yellow Newtown of Virginia, which bears many points of similarity in fruit to that of White Pippin.

WILLIAMS

Though discovered as a "wilding" on the farm of Captain Benjamin Williams more than a century and a half ago, the full merit of this choice summer apple does not appear to have been recognized until recently.

As a commercial variety its planting has been restricted chiefly to the vicinity of Boston and New York until within the last few years, when it has gradually worked its way southward through New Jersey and Delaware, and still more recently has disclosed its special merit as a summer apple for both home use and market in parts of North Carolina and South Carolina, where few northern varieties succeed.

Its firm flesh and relatively tough skin render it one of the best early varieties for long carriage, and such tests of trans-Atlantic shipments as have been made indicate that high prices can be had for it in July and August in the markets of the United Kingdom.[1]

The tree is said to be a rather slow grower and does better when top-grafted on vigorous stock. This is shown by the variety as growing in the Station orchard, where it is represented only by some top-grafts in a large tree of Munson. These are vigorous and have made an upright growth. They have been bearing fruit for a number of years.

Two points of excellence have been noted, one of which is especially prominent. The variety was grafted in 1913 into a tree of Tolman which had suffered from extreme infection of blight, and under these conditions Williams has passed through two seasons entirely free from infection. The period of bloom is long and extends over into the season of the later-blooming varieties, such as Rome Beauty and Northern Spy.

The fruit is medium to large; form oblong to nearly ovate; skin thick but not tough, with smooth surface; undercolor light green, almost covered with streaks and splashes of rich dark crimson; flesh greenish white, sometimes tinted with pink, very firm, somewhat coarse and juicy at picking time, becoming more tender and eventually mealy when overmature; flavor mild subacid, with a mild pleasant aroma; quality good.

The period of bloom is May 6 to 11. The fruit is almost fully colored and still very firm when ready to fall from the tree, which is during the first and second weeks of August. It matures rather slowly after picking, and should be exceptionally good for a shipping market, being so much more firm when ripe than other early apples of the same season. It is also one of the most attractively colored of the early varieties. It is most satisfactory as a dessert apple.

Williams can be recommended for trial in all parts of Ohio as a very attractive summer apple of good dessert quality, besides having a late period of bloom and being practically immune to blight infection through the twigs.

[1]W. A. Taylor, *Promising New Fruits*, Yearbook, U S Dept of Agriculture (1908), p 476.

WINESAP

This old and well-known variety is one of the comparatively few which are particular as to soil and altitude. In a discussion of the variety as grown in the Piedmont region of Virginia,[1] and in the Ozark region of Missouri and Arkansas,[2] it was brought out that Winesap develops its best size, color and quality only on certain soils and at certain elevations. Elsewhere the variety attains this degree of excellence only in the most favorable seasons, and with the most careful methods of culture.

This is more or less the status of the variety in central and southern Ohio. In the counties bordering on the Ohio River, Winesap produces satisfactory crops on the lighter, well-drained soils, while in low-lying, moist locations it does not color well and is more subject to apple scab. Its behavior in the Station orchard indicates that, if spraying against the scab should be omitted from the usual orchard practice, the variety would be practically worthless.

In both tree and fruit, Winesap shows characteristics which become very interesting when its rather numerous seedlings are studied. Among these, Arkansas, Arkansas Black, King David, Kinnard and Stayman Winesap are described elsewhere in this bulletin. Among the characters of Winesap almost constantly reappearing in the seedlings are the dark-gray color of the older bark, the more or less spreading habit of growth, the susceptibility to apple scab, the peculiarly mottled color effect and the purplish shades of red in the fruit, the five protuberances surrounding the basin, the yellowish color of the flesh and the subacid flavor.

The tree is rather small and of a distinctive habit of growth. The main branches are upright, with slender laterals spreading or horizontal, often drooping with fruit bearing. The older bark is brownish gray. Twigs are rather stout, dark red or purplish brown, overlaid with gray scarfskin; leaves rather small, of heavy texture, dark green. The tree is free from blight and other serious diseases, excepting apple scab where spraying is not practiced.

Two trees planted in the Station orchard in 1900 have made a very uniform growth, and since the first small crop of fruit in 1910 have produced annual crops, averaging a little less than 3 bushels annually for the 6-year period. In dry or otherwise unfavorable seasons the apples were too small, in comparison with the standard varieties adapted to this locality, to be valuable for anything else but cider making. One crop was produced in which the apples were as large as Winesaps from southern Ohio.

[1]H. P. Gould, U. S. Dept. of Agriculture, Bureau of Plant Industry Bul. 135 (1908).
[2]Gould and Fletcher, U. S. Dept. of Agriculture, Bureau of Plant Industry Bul. 275 (1913).

The fruit is medium to small when well grown; form roundish-conic; skin thin, rather tender, smooth, or roughened by a netveined scarfskin; undercolor clear yellow, in most specimens completely covered with crimson, mottled and sometimes indistinctly streaked with shades of deep carmine or purple; flesh yellowish, with tinges of pink near the skin and along the core lines; texture firm, juicy, a little coarse and granular; flavor rich aromatic subacid; quality very good.

The period of bloom in the Station orchard is May 5 to 10. The fruit is ready for picking the second or third week of October, and should be picked as soon as well colored on account of a tendency to water-core if left on the tree too long. In cellar storage the maximum quality is attained in March or April, and the fruit often keeps in good condition until June. In a test made in cold storage, the apples matured in June, and 80 percent were in fair condition and flavor at the conclusion of the test, August 24.

As a culinary apple Winesap is one of the very best. The cooked fruit retains its shape, but is tender and of excellent flavor, the rich yellow color making it unusually attractive. As a dessert apple it is very good when mature, but not as tender and fine-grained as Stayman Winesap.

The adaptation of Winesap to a locality, or more particularly to a location, can be determined only by a trial planting. It is safe to say that, if the variety has not already been tested in the locality, the trials should in most cases be confined to the southern half of the State, and that attention to spraying, pruning and fertilizing will add materially to the degree of success attained.

WINTER PARADISE

This is a sweet apple found in many orchards of Ohio. It is one of the best winter sweet apples for this section, but is rather late in coming into bearing. It is of Pennsylvania origin.

The tree is very upright at first with long, slender branches. The laterals are spread out by fruit bearing, which consists often of excessive crops alternating with moderate or very light crops. The tree is practically free from disease.

The fruit is medium to large, oblate-conic, with a broad base; skin thick, tough, smooth; color dull green becoming pale yellow, often largely shaded with a brownish-red blush. The coloring is modified by an extensive whitish scarfskin. Flesh is yellowish white, firm, juicy, fine-grained; flavor very sweet, with a peculiar aroma which is unpleasant to some persons; quality good; season January to March.

This variety is useful only as a dessert apple. When the apple is cooked, its flavor is very insipid, and in tests made with this variety the notes contained the statement, "The sauce made from this apple did not taste as sweet as that made from Winesap, a subacid apple, though equal amounts of sugar were added."

Among the comparatively few winter sweet apples of good quality, Winter Paradise is a desirable variety, though not high in quality as compared with the standard subacid apples.

WOLF RIVER

This variety originated near Wolf River, Fremont County, Wis. It is supposed to be a seedling of Alexander, a large-fruited Russian variety, and is fairly well known in Ohio.

The tree is of moderate growth, with wide-spreading branches, making a low top. The laterals and twigs are often slender and drooping. Older bark is gray; twigs are brown; leaves large. The branches are likely to be affected by sunscald, especially when bent down by the frequent heavy crops of fruit. Unlike Alexander, it is not susceptible to blight to any serious degree. The tree is not difficult to prune and spray, and the fruit is easily thinned and picked.

Moderate to heavy annual crops have been produced by mature trees of Wolf River in the Station orchard. A young tree produced the first heavy crop of more than 6 bushels at 14 years from planting and 7.4 bushels the following year.

The fruit is often extremely large, specimens measuring 4 inches or more in diameter being common; form oblate; skin rather thick and tough, smooth, covered with a heavy whitish bloom; undercolor greenish or pale yellow, largely mottled and shaded with pink to crimson, becoming carmine in highly colored specimens, and often marked with splashes and streaks of the darker color; core large, partly open; flesh white, with a tinge of yellow, firm, somewhat tough and coarse; flavor subacid, with mild aroma; quality fair for culinary uses, very poor for dessert; season the first half of September; period of bloom May 4 to 10.

The crops require thinning almost every year because of the short stem, which favors the early dropping of the fruit by crowding from the clusters. The fruit is difficult to keep free from insect injuries, especially those caused by the curculio and the codling worm.

The very large, well-colored apples command a ready sale wherever they are offered, but are not sufficiently high in quality to secure a permanent trade.

As a culinary apple Wolf River makes a pale-colored sauce, rather pasty in texture, and somewhat insipid in flavor. It is a little better in pie. In competition with Wealthy of the same season, the Wolf River cannot be considered promising, and, except for the production of large apples for exhibition purposes, is not to be recommended for planting in Ohio.

YELLOW BELLFLOWER

In its wide dissemination, this variety has found many adaptations, from a position of ordinary commercial importance in one section, to that of being the most important variety of its season in another section.

The variety originated in New Jersey during the eighteenth century, and has been distributed to every fruit-growing district in the country. As grown in New York it is of importance only as an apple for home use and local market. In Ohio, Yellow Bellflower has the peculiar reputation of being at the same time a culinary apple of high quality, and one of the least profitable because of its irregular and usually very light crop production. In California it has gained such prominence that Wickson writes: "The Yellow Bellflower, as grown in California, has such conspicuous excellence that during its season it is hardly likely to be misplaced for any other variety."[1]

This variety can be identified among many others by the vigorous, wide-spreading habit of growth with long horizontal lower branches.

The tree in the Station orchard is one of the largest among the varieties of its age. Only one fair crop has been produced during the last 6 years—13.3 bushels in 1913, 20 years from planting, with 4.7 bushels annually as the average for 6 years.

The fruit is usually large; form irregular, roundish-ovate; skin smooth, becoming oily in storage; color clear lemon-yellow when mature, more or less blushed with brownish pink; core very large and open; flesh creamy white, tender, fine-grained, juicy; flavor brisk subacid, aromatic; quality very good for culinary uses, and for dessert when fully mature.

Period of bloom is May 3 to 9. The fruit is ready for picking the third week of October. It matures in cellar storage soon after picking, and is at its best in November and December. In a cold storage test Yellow Bellflower kept in good condition until March.

Unless a method of orchard practice can be evolved which will correct the deficiency in crop production, Yellow Bellflower must be considered as an undesirable variety for Ohio orchards.

[1] *Apples of New York*, I, 382

A number of varieties are known which resemble Yellow Bellflower sufficiently to constitute a distinct Bellflower group. Among these are included Dickinson, Flory, Kirkland, Mason Orange, Minister, Moyer, Newman, Occident, Ortley and Titus Pippin, three of which are known to be seedlings of Yellow Bellflower. The yellow color, ovate or oblong form and the large, open core are characteristics of this group.

YELLOW NEWTOWN

In a description given in Bulletin No. 7, by Wm. A. Taylor, of the U. S. Department of Agriculture, Division of Pomology, the history of this variety is discussed at some length. The account is concluded with the statement, "There is little doubt that the first appearance of the Albermarle Pippin (Yellow Newtown) was at Castle Hill (Albermarle County, Va.) from grafts brought home from Pennsylvania by Dr. Thomas Walker after Braddock's defeat in 1755."

In the same description Mr. Taylor says: "The tree is rather slender and of slow growth, becoming large and spreading as it attains age, and is characterized even when young by rough bark. It is slow to begin bearing, but in favorable locations is abundantly productive after it attains an age of 15 or 20 years. In the northern states it has generally been found most successful on rich limestone soils, though the famous 'pippins' of Virginia and North Carolina are mostly grown upon the loose, friable, granitic soil of warm mountain coves."

The variety is represented in the Station orchard by two young trees which produced a few apples as a first crop in 1914 at 9 years from planting. It is grown to a limited extent in other parts of Ohio, and the lateness of its season would indicate an adaptation in that respect to the southern counties of the State.

The trees are of a moderately vigorous, somewhat bushy growth; branches divergent, long, rather slender. Older bark is dark gray; twigs are brown; leaves medium to large. So far these trees are free from disease. When they are not thoroughly sprayed, their susceptibility to apple scab becomes very noticeable.

The fruit is large; form often irregular or oblique, usually roundish-oblate to oblong; skin thick and tough, rather dry and harsh, often marked with russet; color greenish yellow, sometimes faintly streaked with brownish pink; flesh creamy yellow, very firm, juicy, fine-grained when mature; flavor sprightly subacid, becoming milder at maturity, and with a rich, pleasing aroma; quality very good for nearly all purposes.

The period of bloom in 1914 was May 6 to 13. The fruit was ready for picking the last week of October. The apples mature in cellar storage in late winter and keep as well as White Pippin, which they resemble in several points.

The adaptability of Yellow Newtown to Ohio conditions is about the same as that of Winesap, and the varieties seem to be almost identical as to soil requirements. However, in competition with other late-keeping varieties better adapted to Ohio conditions, Yellow Newtown cannot be considered as promising, except in especially favorable locations.

YELLOW TRANSPARENT

In its wide range of adaptability and in earliness of season this variety is of foremost importance. It has been found successful in practically every apple-growing section of the United States and Canada, and is, with the exception of a few varieties of minor importance, the earliest commercial variety of the apple season.

It was imported from St. Petersburg, Russia, by the U. S. Department of Agriculture in 1870.[1] Including the later importations by the department and others, about 350 varieties of the east-European or Russian apples had been introduced prior to 1888 for trial in the region west and southwest of the Great Lakes, where the climate resembles that of central Russia. Among these varieties Yellow Transparent has been found one of the most desirable.[2]

This variety has a peculiar and distinct habit of growth. The main branches are very upright, and if allowed to grow without training make a very tall, narrow top. A spreading top is possible with a young tree by staking and tying down the branches; and, considering the amount of pruning and heading back in favor of the side branches, which must be done if the tree is trained in the ordinary way, staking and tying down would in the end be the least expensive and most effective way. The branches are fairly stout, and the wood is stiff and strong. The older bark has a peculiar yellow-brown color. The twigs are medium to stout, brown; leaves large, rather light green. The trees are considerably smaller than adjacent Ben Davis of the same age. In common with many of the Russian varieties Yellow Transparent is susceptible to blight in all its forms, being especially liable to serious injury when the tree is small, and the progress of the disease carries it rapidly to the main branches. Blossom blight becomes very serious in some seasons, and cases

[1]Chas. Downing, *Fruits and Fruit Trees of America* (1881), Third Appendix, p. 118.
[2]T. T. Lyon, U. S. Dept. of Agriculture, Division of Pomology Bul. 2.

have been reported in which the crop of fruit was largely destroyed by the disease. Other diseases are of minor importance with this variety.

Fruit bearing begins at an early age. The first fruits often appear the second or third year after setting the trees. The crops gradually increase, and under good conditions nearly annual crops are produced. If overproduction is permitted a biennial bearing habit may be developed. Thinning is highly desirable with all the heavier crops. The fruit is borne on both the terminal buds and spurs, on the former more often on young trees. A tree in the Station orchard in its twenty-first year set fruit in 1914 to the number of 12,172, of which 6,942 were removed by thinning, leaving a crop to mature of more than 16 bushels at picking time. An average of 7.6 bushels annually has been produced by the trees during a 5-year period.

The fruit is medium to small in the average heavy crop; form roundish-conic; skin smooth, with a very light, whitish bloom; color very pale lemon-yellow, becoming nearly white with maturity. An occasional speciment shows a delicate pink blush. Flesh is white, very fine-grained and tender when mature, becoming mealy when overripe; flavor subacid, mildly aromatic; quality very good for dessert, excellent for culinary purposes.

The period of bloom in the Station orchard extends from May 3 to 10. The fruit ripens over a long period of time, but the main pickings can be made the third and fourth weeks of July. A fair quality of sauce can be made from the more advanced fruits on the upper branches as early as the first week of July. The fruit cooks quickly to a fine sauce, and is one of the best early varieties for culinary use. The flavor deteriorates quickly after maturity, and for dessert it is best when the fruit is allowed to mature on the tree until the greenish color has disappeared.

The tenderness of the fruit makes successful packing and shipping a tedious operation on account of the extreme care necessary. Yellow Transparent apples picked when still rather immature from trees in the Station orchard were packed in layers without wrapping in 20-pound Climax baskets, and shipped to Columbus. A high price was obtained, and a very satisfactory report received from the commission firm as to their condition upon arrival.[1]

Yellow Transparent can be recommended as an early apple adapted to all parts of Ohio, and it can be depended upon to give satisfaction in the home orchard as well as in commercial planting in any but the most unfavorable locations.

[1]Letter from Sutton Bros, Columbus, Ohio, July 29, 1914

YORK IMPERIAL

This is a variety of distinct and uniform characteristics. Its identity is not easily mistaken after its most prominent characters are known. The oblique axis of the fruit is the most constant character, and constitutes a rather serious defect when box packing is attempted with this variety. An objection is also made by the firms engaged in evaporating fruit, in which case the difficulty in machine paring of York Imperial becomes apparent.

The variety originated on the Johnson farm in York County, Pa. Jonathan Jessop, a local nurseryman, began its propagation some time before 1830, under the name of Johnson's Fine Winter. The name which it now bears was suggested by the late Charles Downing. It has been distributed throughout the middle Atlantic, central and middle western states, and is a leading commercial variety in many sections.[1]

The tree is of vigorous growth, bushy and dense if not regularly pruned. Branches are long, divergent, stout; laterals often rather slender and drooping. Older bark is gray. Twigs are medium to stout, light brown; leaves medium to large, of heavy texture, dark green.

The tree sometimes suffers severely from blight, which destroys many blossoms and twigs and leaves an occasional canker in the branches.

Trees planted in the Station orchard in 1900 produced the first crop in 1912, and since then have borne a yearly average of 4.6 bushels per tree. The older tree, now 22 years from planting, has averaged 12.7 bushels annually during a 5-year period. When not thinned, the apples are often very uneven in size in the heavy crops. The short stem favors the dropping of much immature fruit by crowding from the clusters. This can be avoided by thinning, which is more readily done when the apples are small, before any crowding of the clusters takes place. Coloring is much improved by thinning the fruit, and has an indirect effect on storage scald, which has been observed to be much more serious on poorly colored specimens.[2]

The fruit is medium to large when well grown; form exceedingly variable, from truncate-oblong and only slightly elliptical to very flat-oblate and extremely elliptical. The oblique axis mentioned in the first part of this description appears in practically every specimen. The skin is thin and tough, smooth, sometimes glossy, with a light bloom; undercolor pale yellow, shaded with

[1]Wm A Taylor, U S Dept of Agriculture Division of Pomology Bul 7
[2]Powell and Fulton, U S. Dept of Agriculture, Bureau of Plant Industry Bul. 48.

bright orange-pink to deep crimson, with faint streaks of crimson; core small, closed; flesh creamy yellow, with greenish core lines and veinings, very crisp and juicy, somewhat coarse in texture; flavor subacid, with a pleasant, rather peculiar aroma, similar to other members of the Romanite group, to which York Imperial belongs; quality good for dessert, sauce and pie but unsatisfactory for baking; season late winter.

The period of bloom is May 6 to 10. The fruit is ready for picking the third or fourth week of October. In cellar storage the maximum quality is developed in March or April, and if not affected by scald will keep in good condition until late spring. In a test made in cold storage the apples matured in July and 36 percent were in fairly good condition at the end of the test, August 24. A large part of those removed on account of decay had developed scald before decay set in. In another test only 28 percent remained free from scald until the end of the test, September 6. Black rot is the organism most often found causing the decay which follows scald on York Imperial.

If the fruit remains free from scald, it is one of the best late-keeping varieties, but, as stated in the description of White Pippin, the future of this class of varieties depends largely upon the discovery of an effective method of preventing storage scald.

The extreme firmness of the fruit at picking time, with the advantage of a very short stem, has gone far to secure for the York Imperial its commercial importance, because of being adapted to the methods of handling and shipping prevalent in the section in which it first gained prominence. Barrel packing is perhaps still the best method of handling, because of the irregular form of the apples, which require especial care in grading for successful box packing.

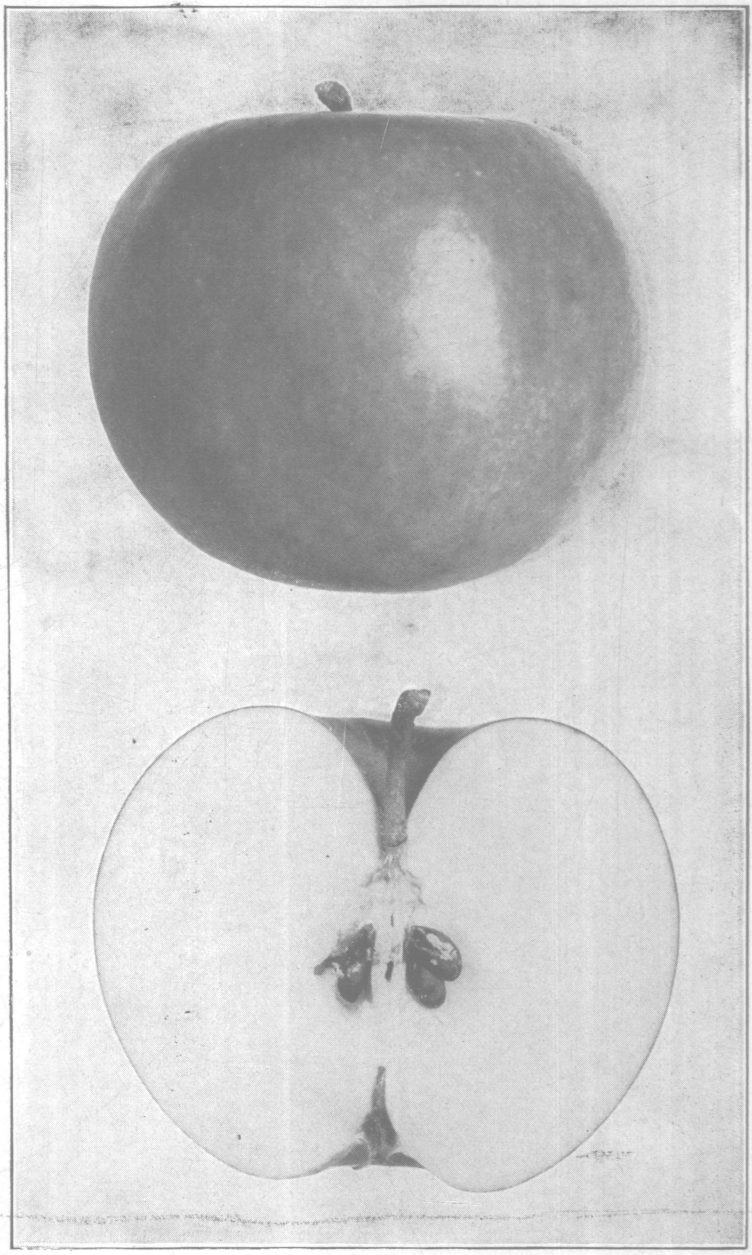

Fig. 3. Arkansas (p. 56)

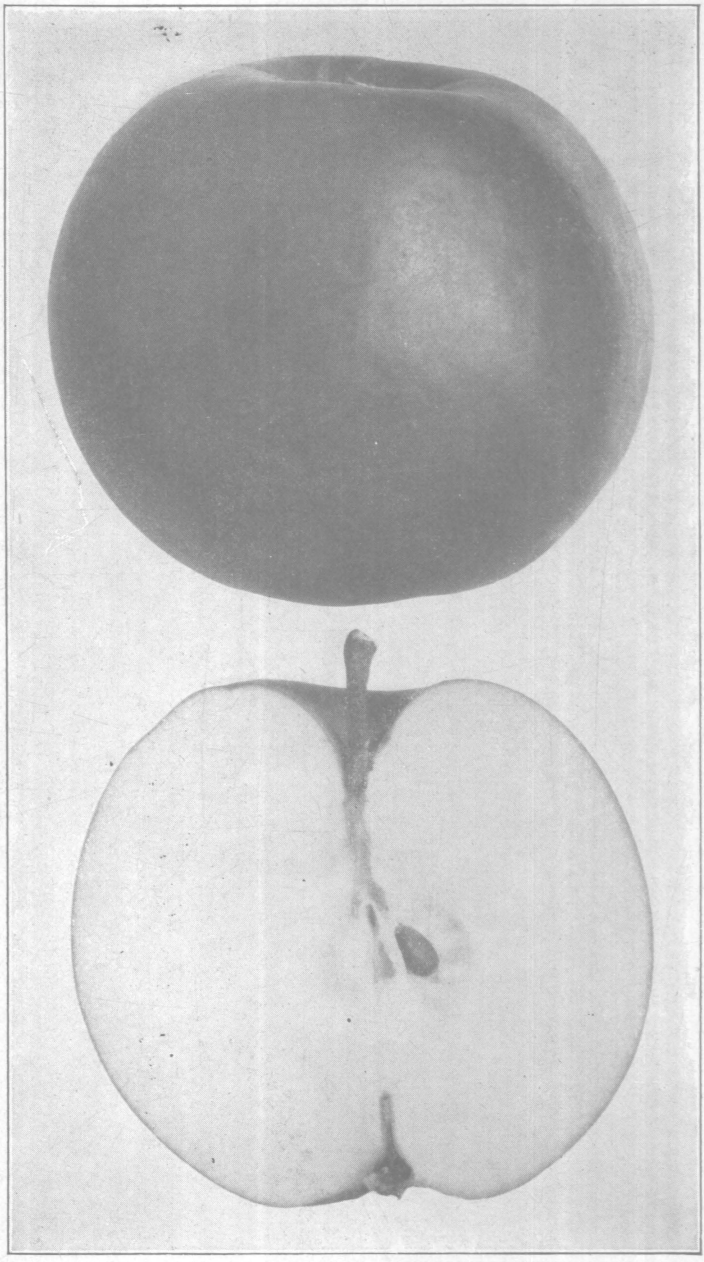

Fig. 4. Arkansas Black (p. 57)

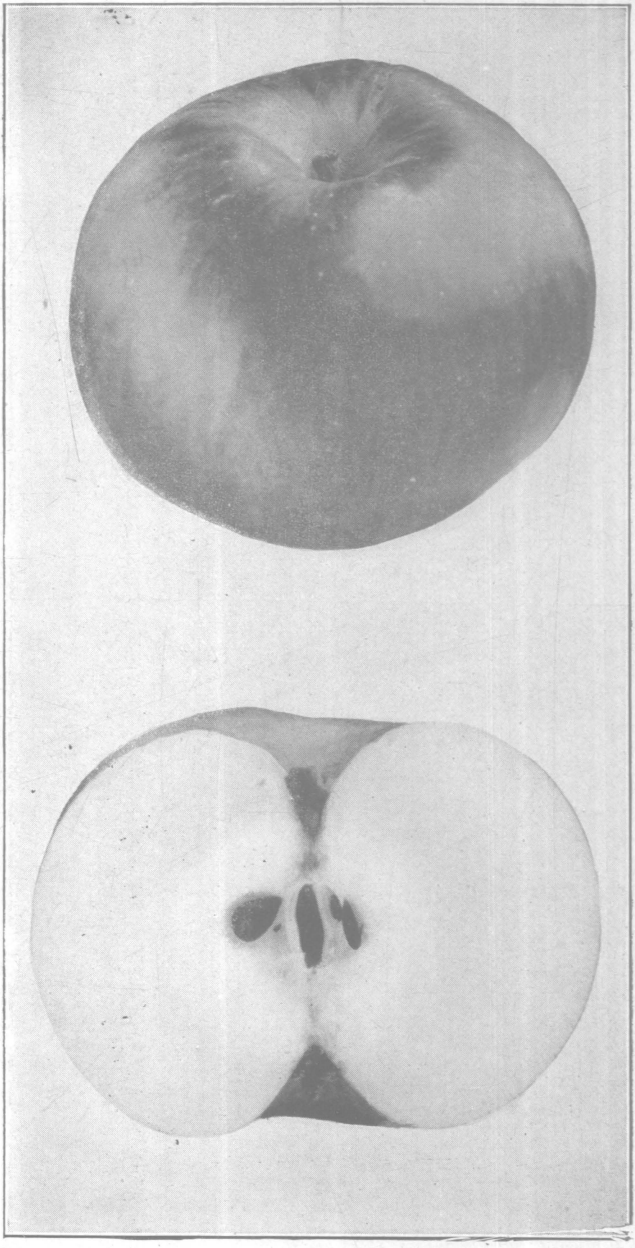

Fig. 5. Babbitt (p. 59)

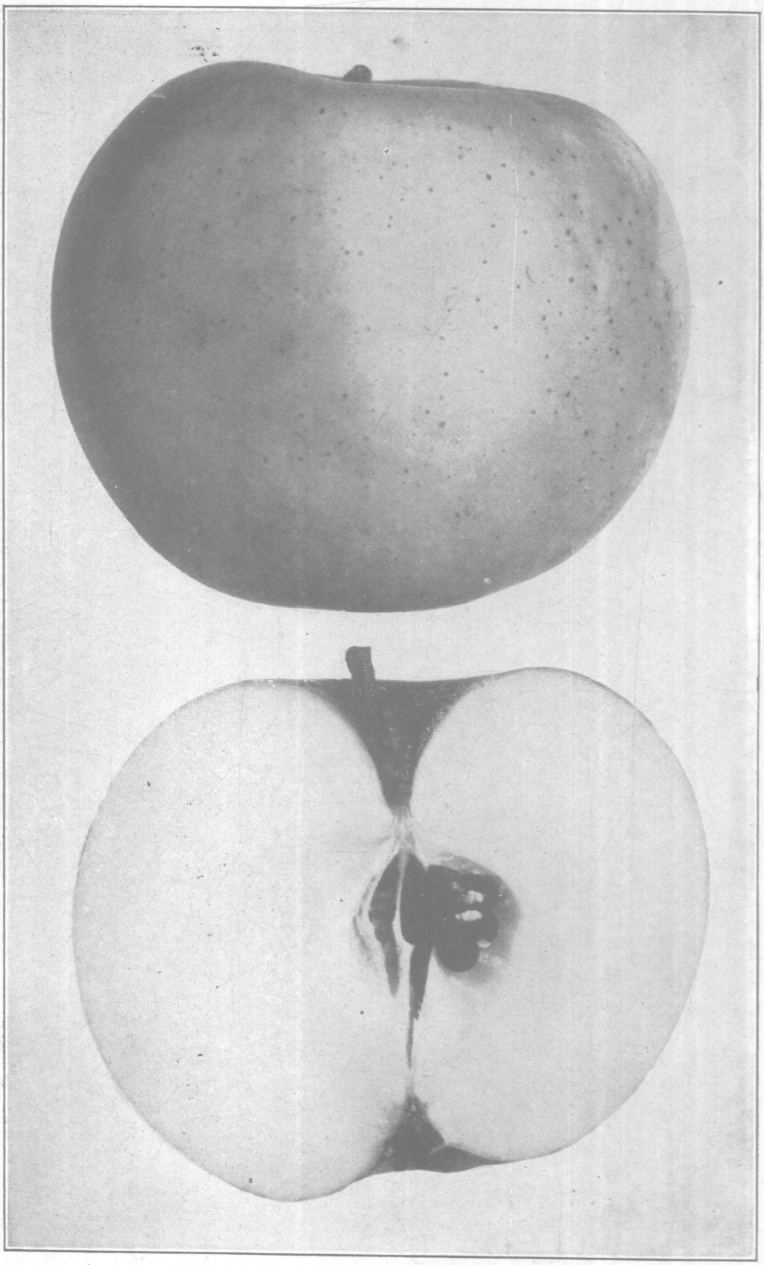

Fig. 6. Banana (p. 62)

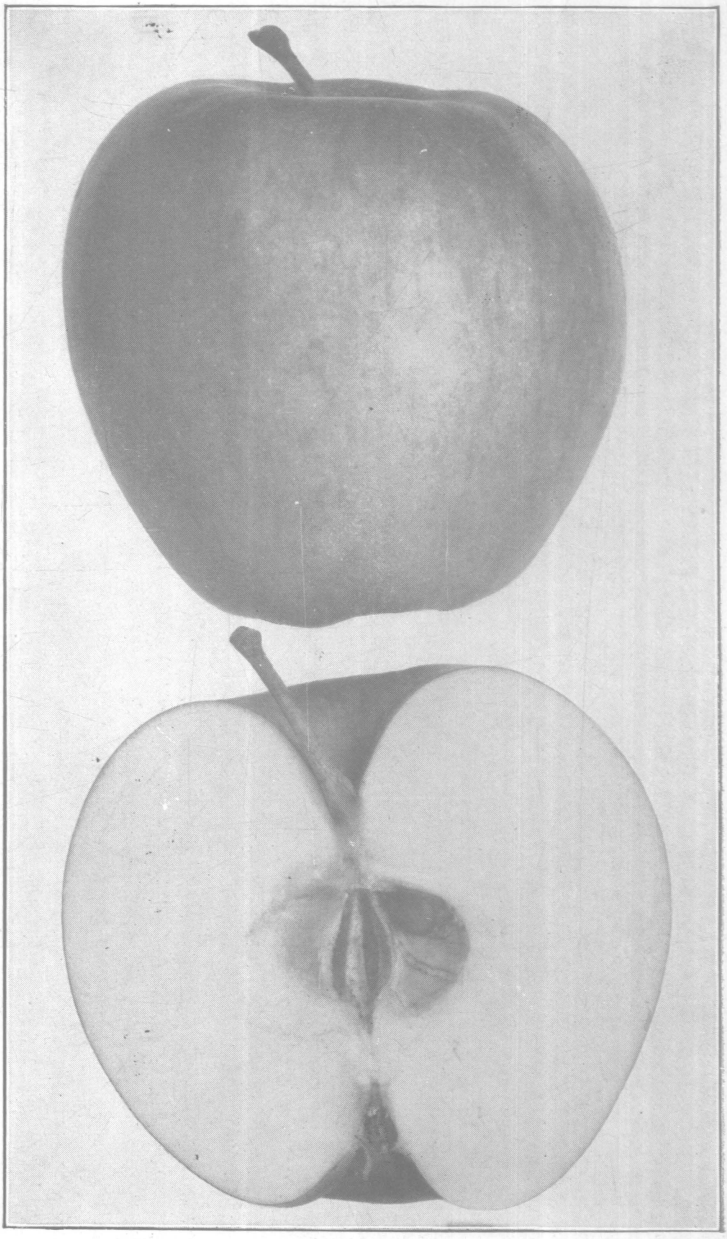

Fig. 7. Delicious (p. 76)

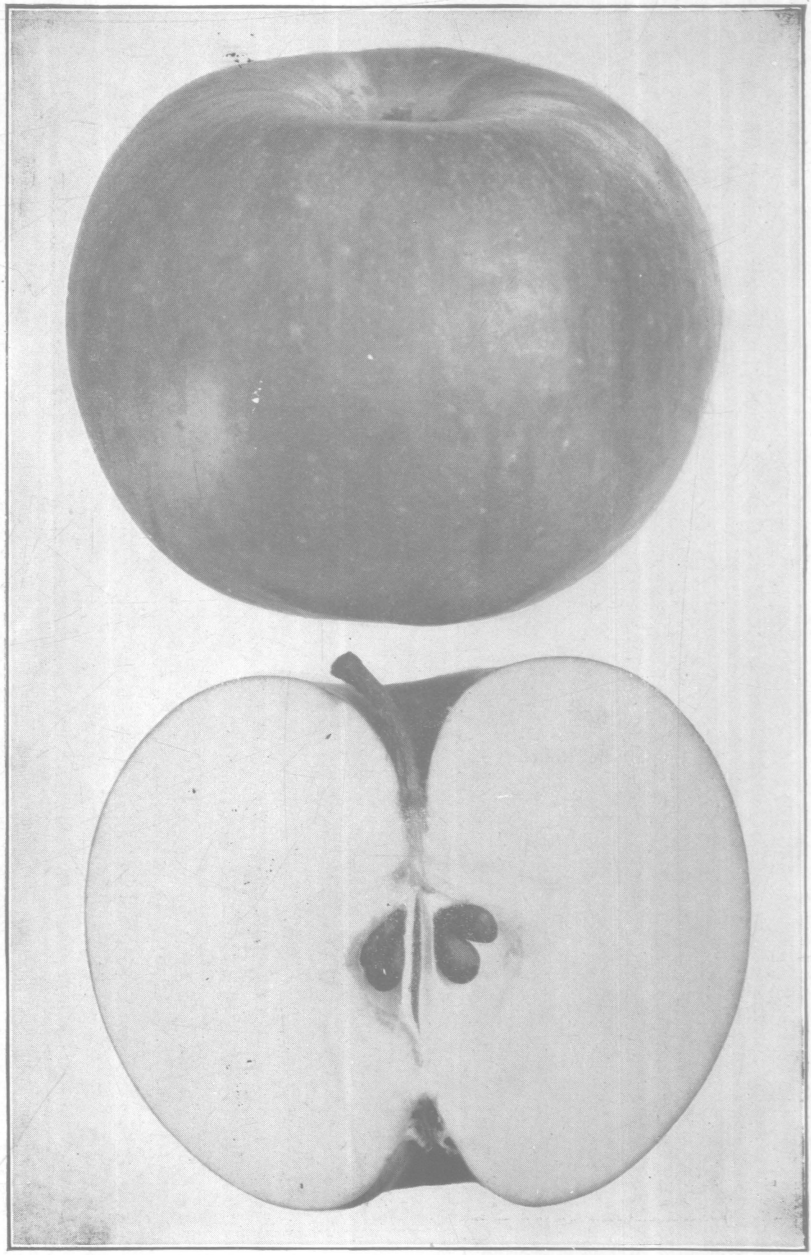

Fig. 8. Ensee (p. 81)

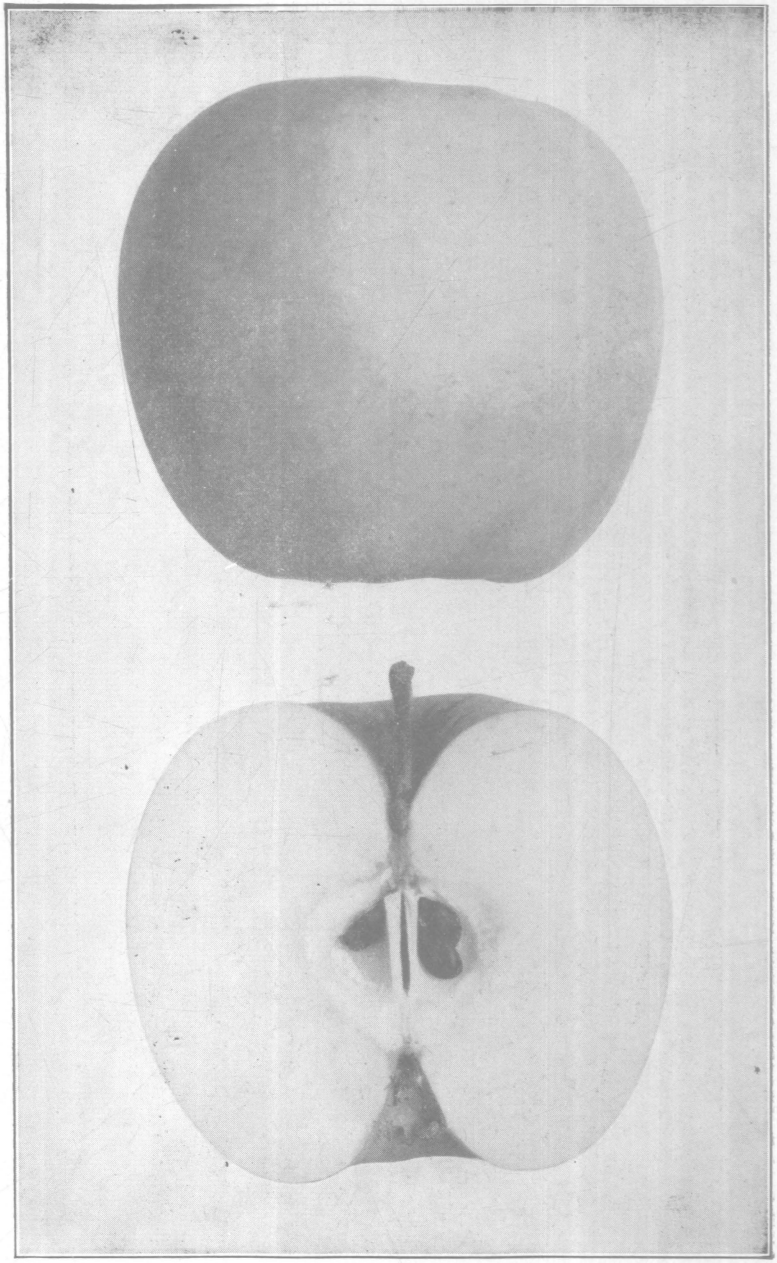

Fig. 9. Grimes (p. 90)

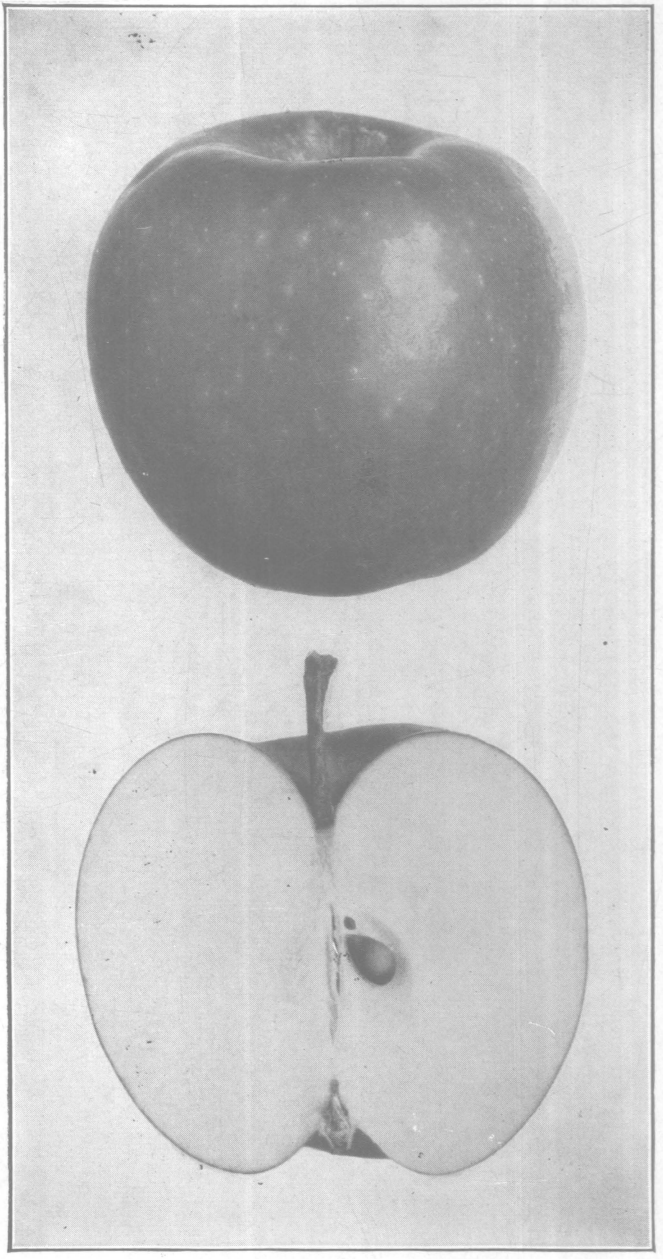

Fig. 10. King David (p. 98)

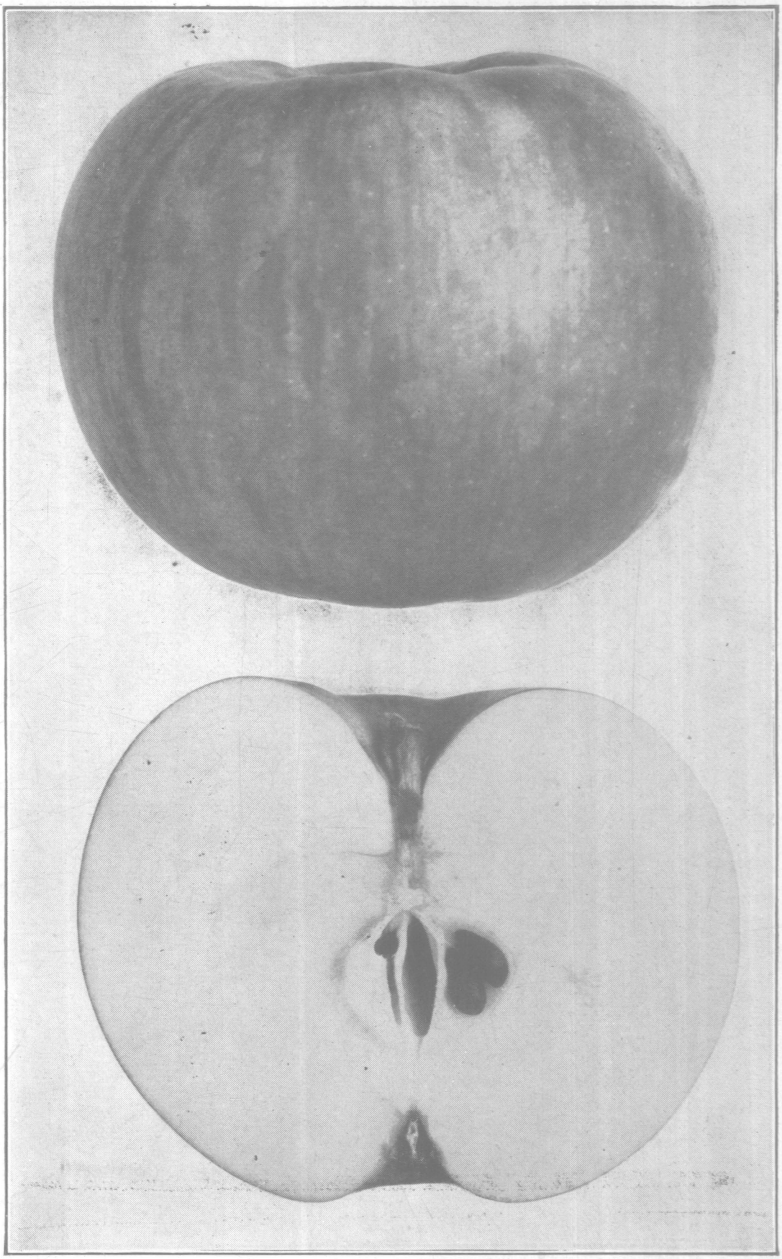

Fig. 11. McIntosh (p. 108)

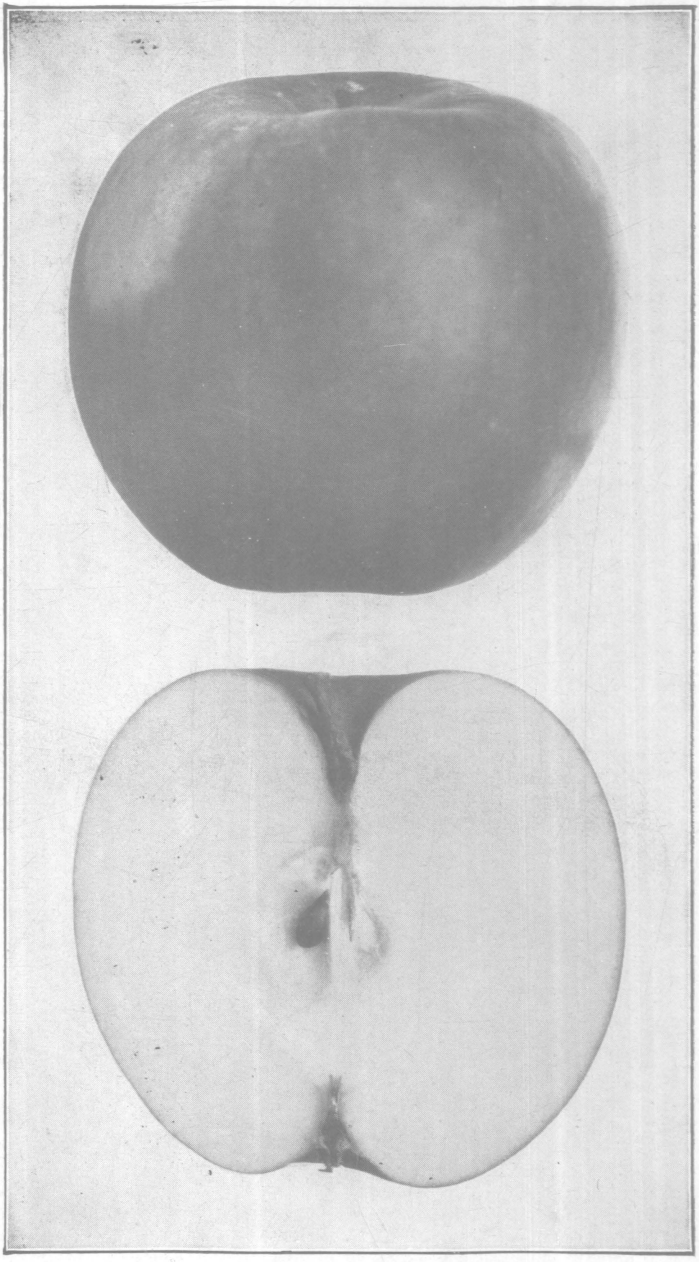

Fig. 12. Mother (p. 111)

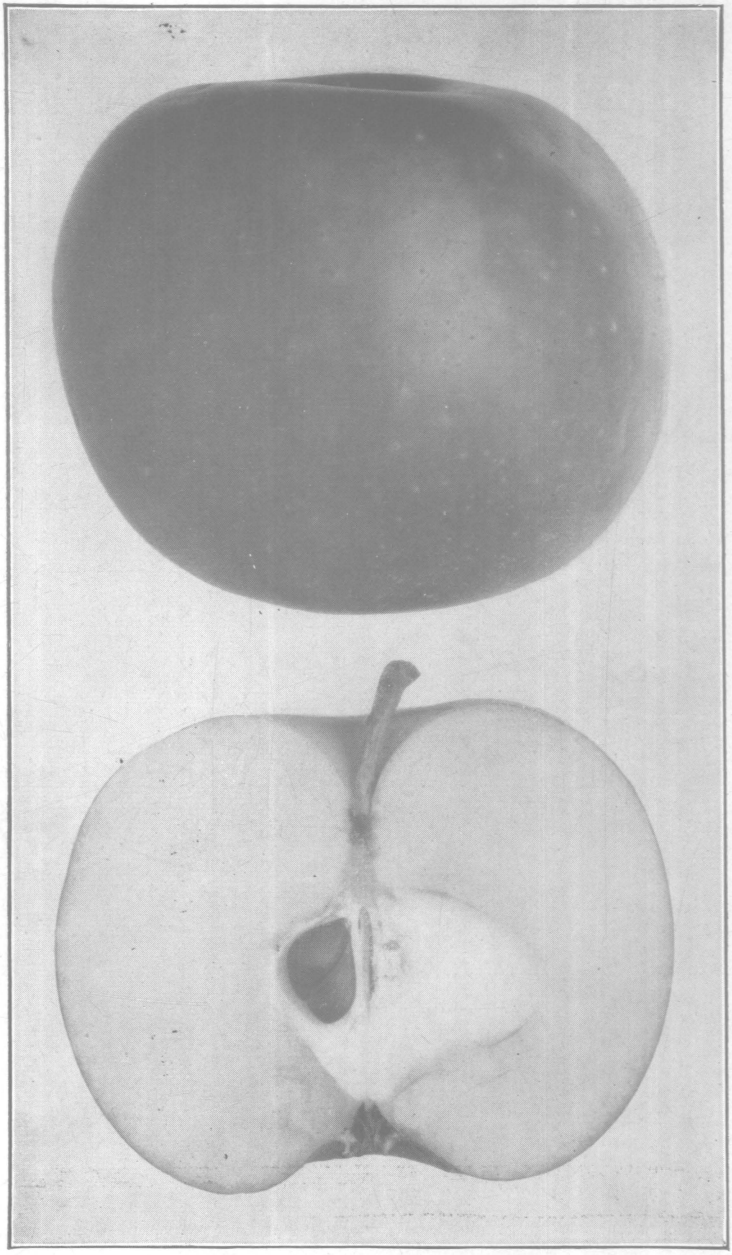

Fig. 13. Oliver Red (p. 121)

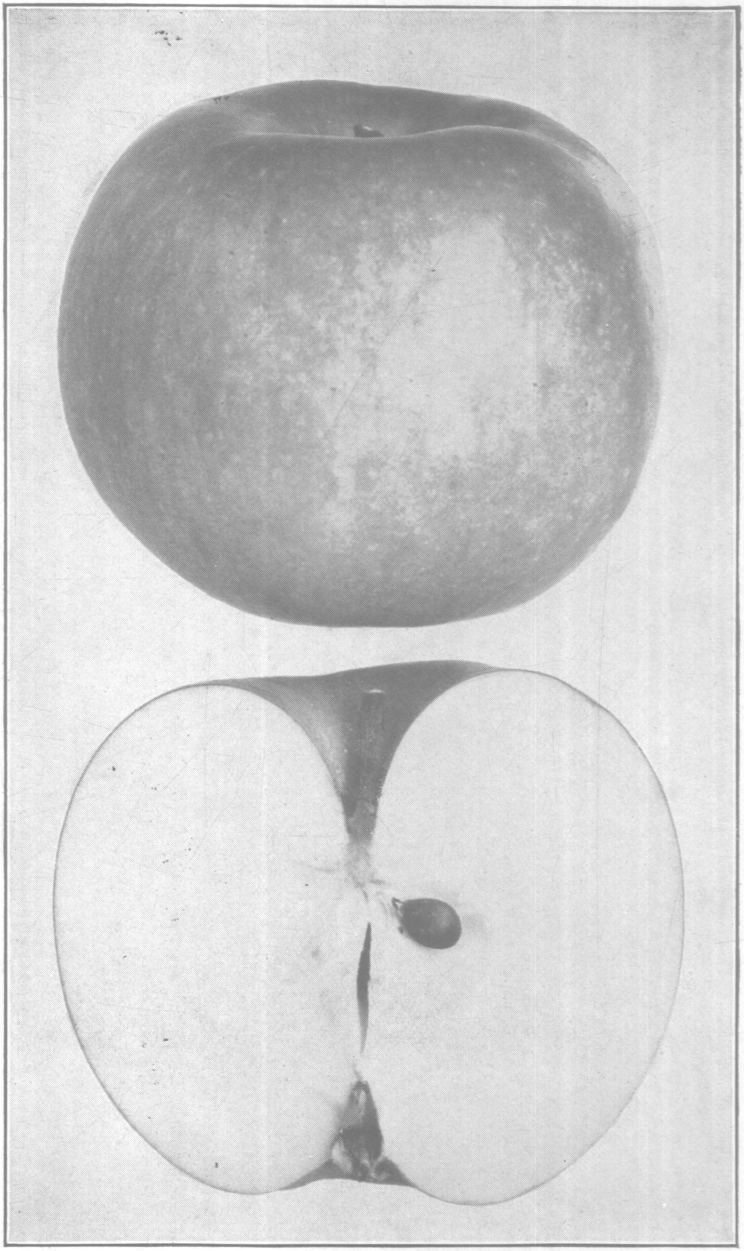

Fig. 14. Red Canada (p. 129)

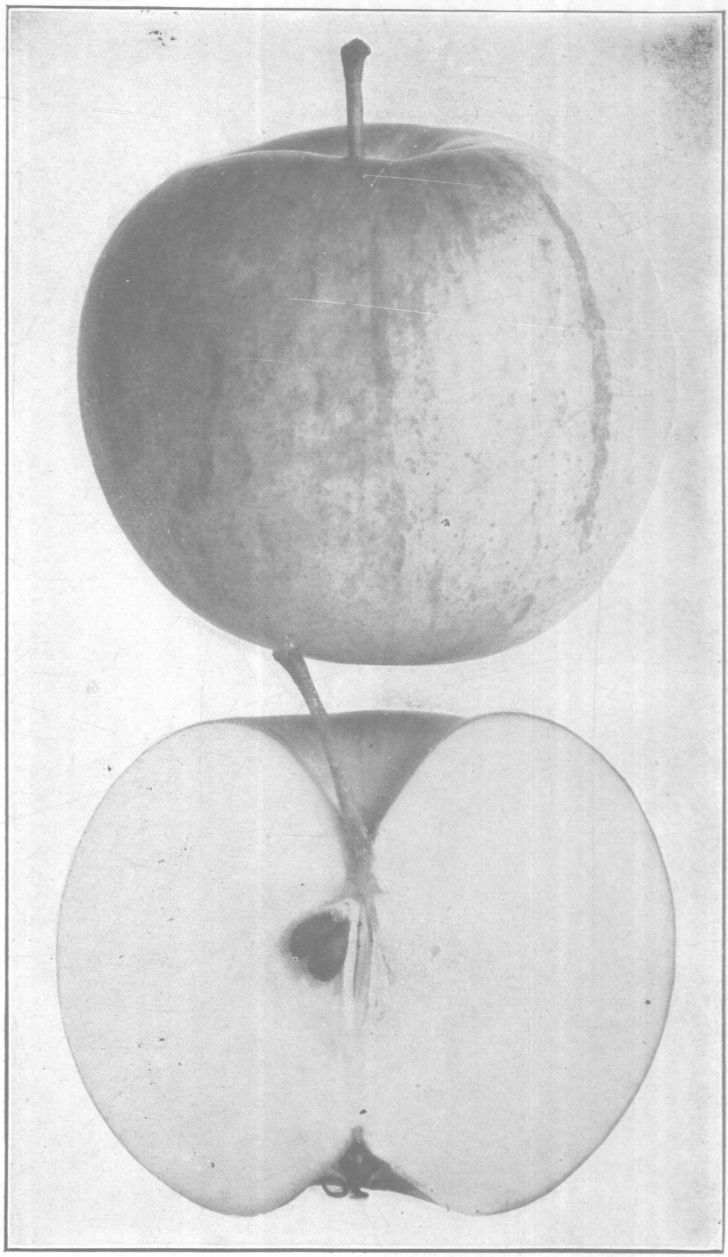

Fig. 15. Rome Beauty (p. 132)

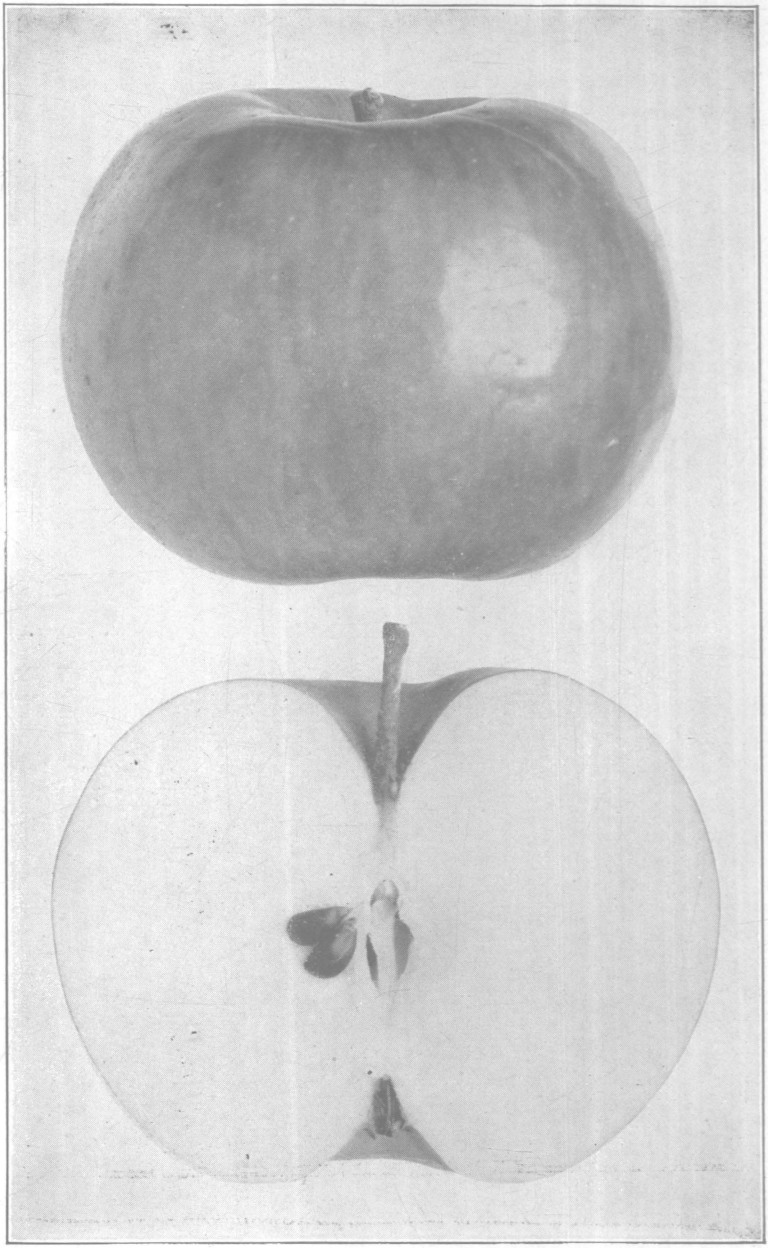

Fig. 16. Shiawassee (p. 137)

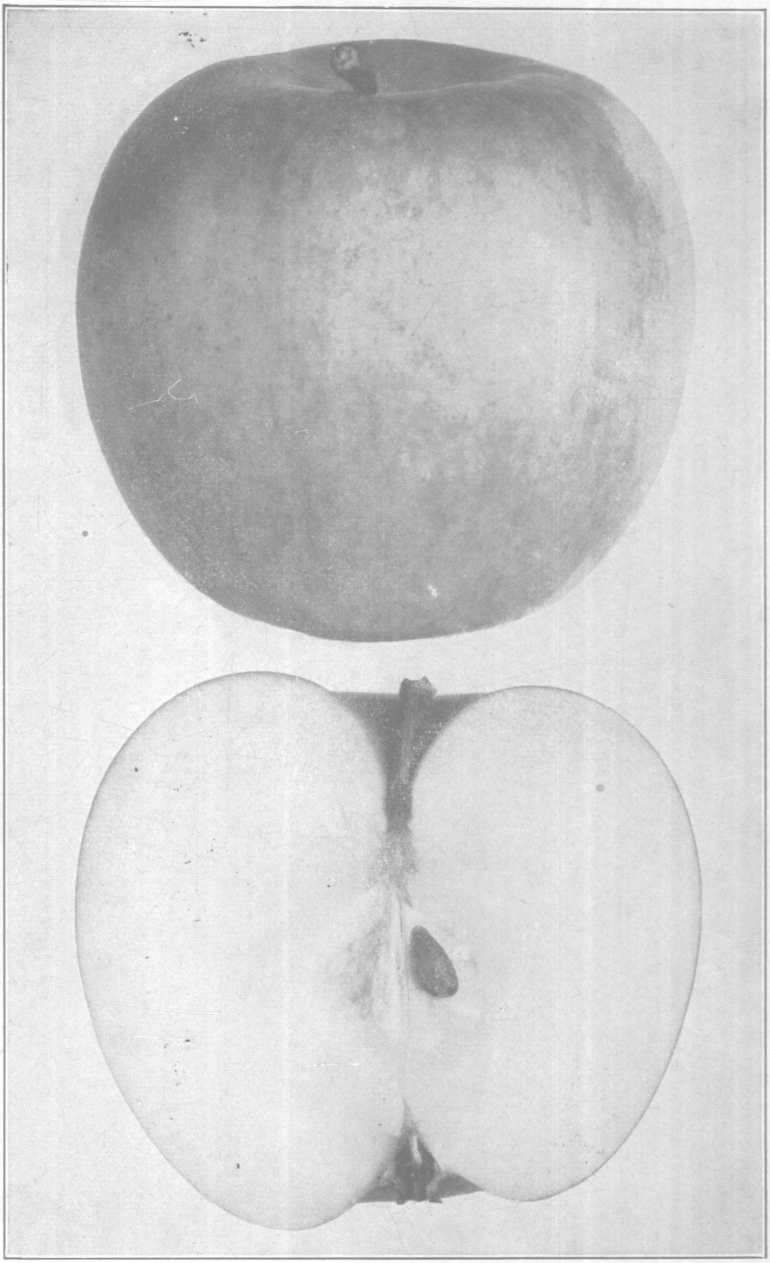

Fig. 17. Stark (p. 139)

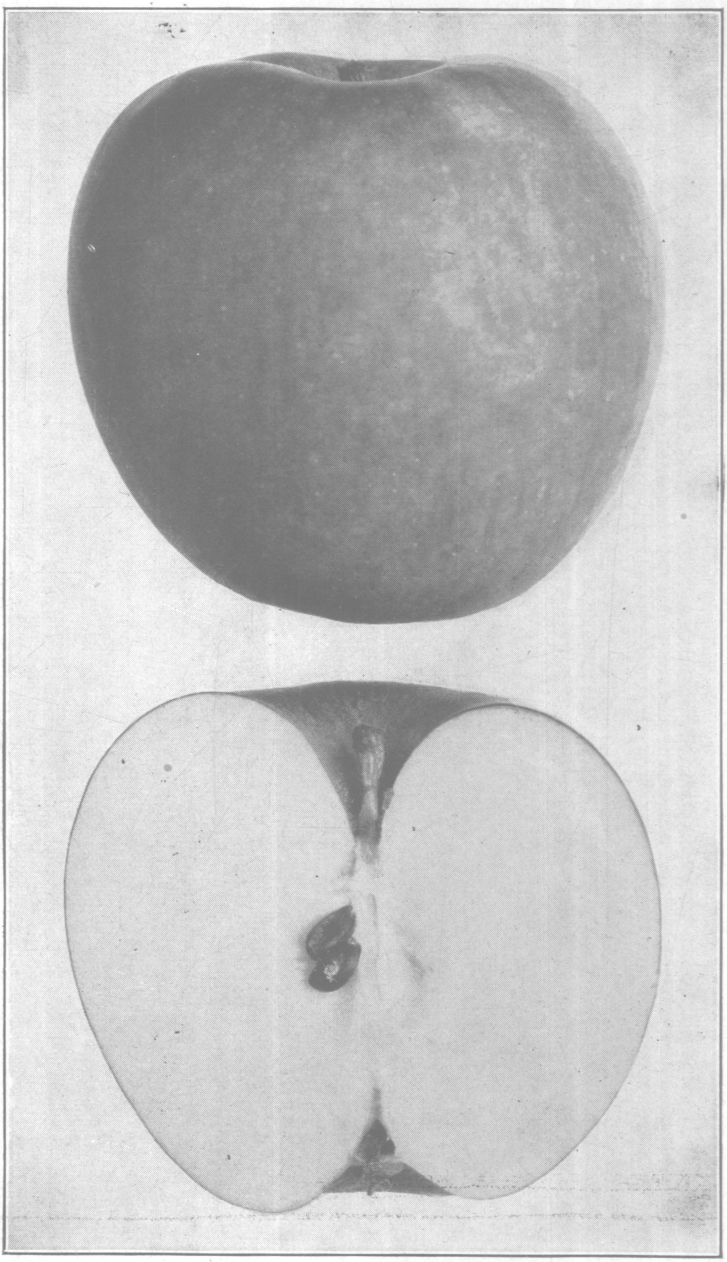

Fig. 18. Stayman Winesap (p. 140)

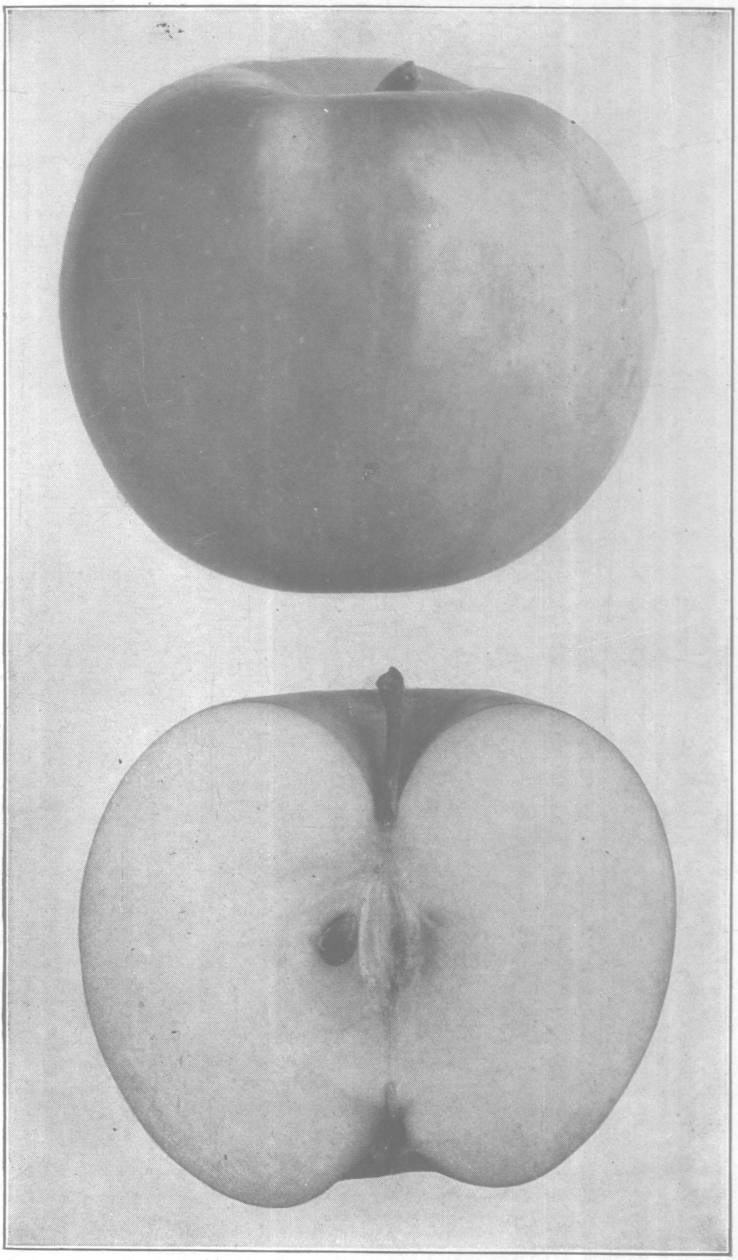

Fig. 19. Sutton (p. 144)

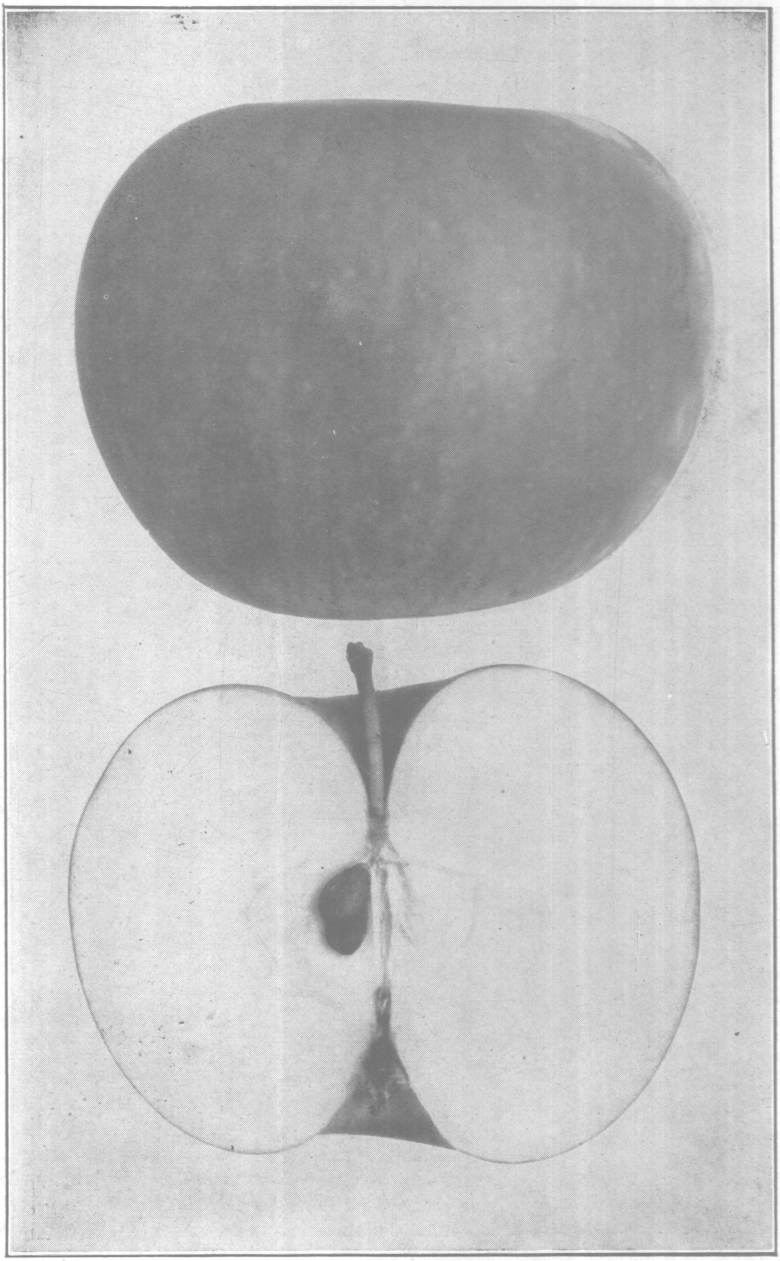

Fig. 20. Wealthy (p. 150)

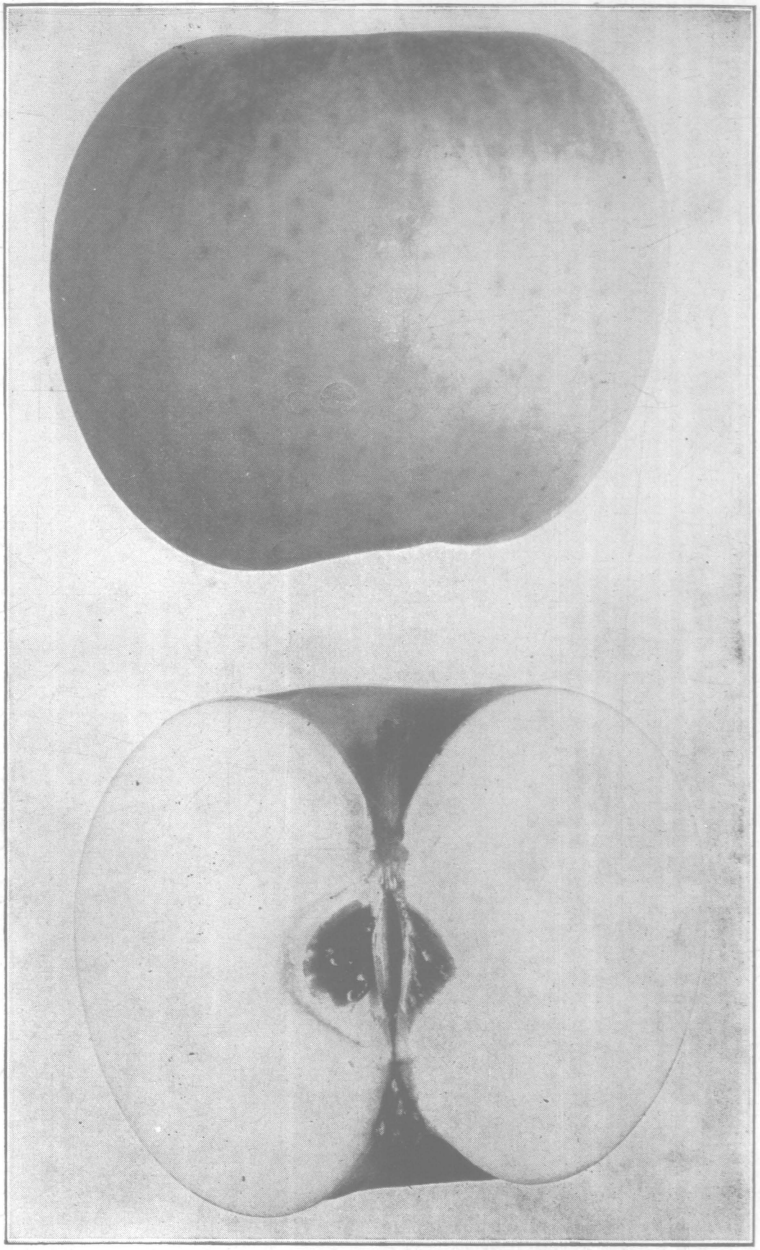

Fig. 21. White Pippin (p. 153)

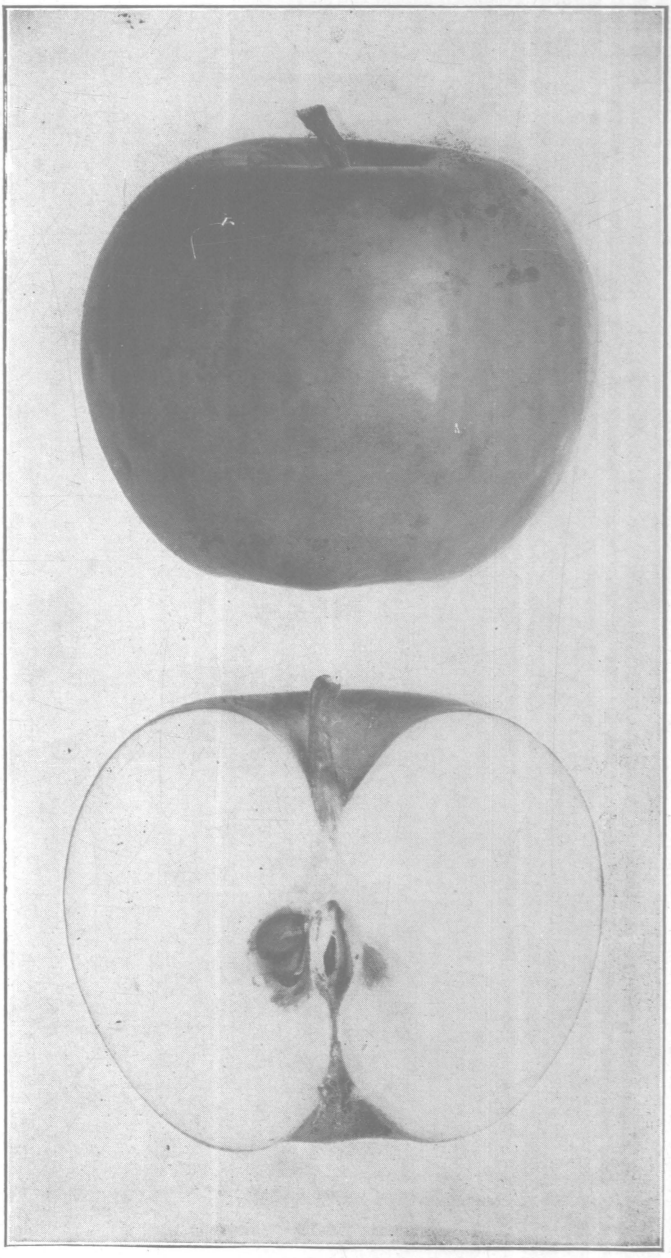

Fig. 22. Winesap (p. 156)